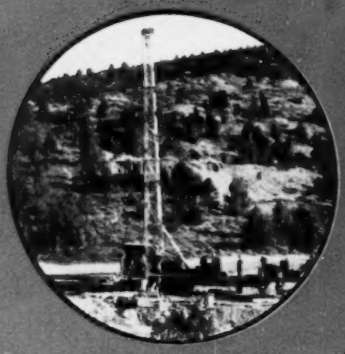
MINING WORLD



in this issue

Eureka Explores With Oil Rigs

Page 40

BECAUSE OF EIMCO
your mine car loader is the most reasonably priced piece of mining machinery you can buy. Other equipment has increased from 50% to 100% or more — with Eimco the increase has been less than 15% in the last 10 years. We believe this statement, therefore, to be true — "no manufacturer has served the mining industry more faithfully than Eimco" — good machines at low initial cost, dependable performance, minimum maintenance and maximum service.
EIMCO
THE EIMCO CORPORATION
The World's Largest Manufacturers of Underground Rock Loading Machines
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GUST 1953

15 No. 9

35 cents a copy
in sterling 3s

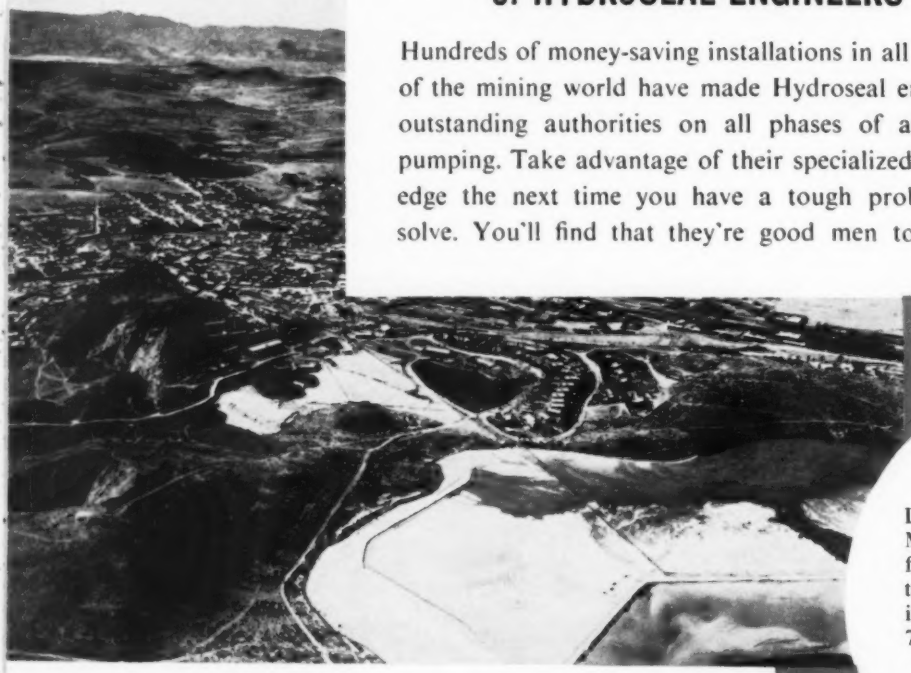
180° F mixture against 152-ft head

Slag and water discharging into fill area at a major Swedish copper smelter near the Arctic Circle. Two Hydroseals in series pump the 180°F mixture against a total head of 152 feet, delivering about 400 tons of granulated slag per day at a rate of 2000 G.P.M.

You'll benefit by the pumping experience of HYDROSEAL ENGINEERS

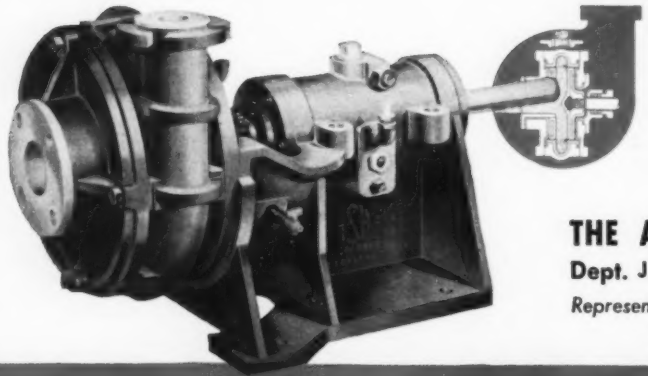
Hundreds of money-saving installations in all corners of the mining world have made Hydroseal engineers outstanding authorities on all phases of abrasives pumping. Take advantage of their specialized knowledge the next time you have a tough problem to solve. You'll find that they're good men to know.

Write for our latest catalog



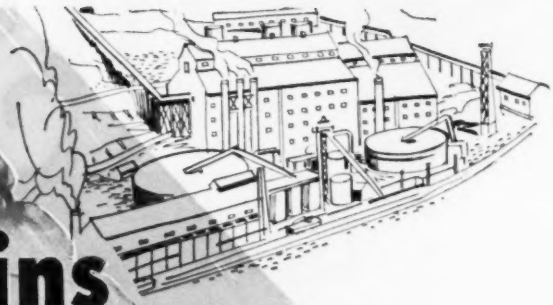
Through 3700 ft of 8-in pipe

Large zinc concentration plant in Mexico, showing tailings dam in right foreground. Tailings are delivered by two Hydroseal Slurry Pumps (one acting as standby) at an average rate of 760 to 1025 G.P.M. through 3700 feet of 8 inch pipe. Both pumps are equipped with automatic speed controls to compensate for changes in volume and/or head.

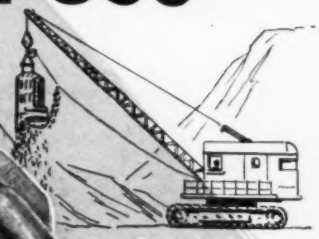


THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.
Representatives throughout the World

HYDROSEAL SAND, SLURRY & DREDGE PUMP
MAXIMIX RUBBER PROTECTE



Amsco Chains Get Tougher With Use



How AMSCO Manganese Steel Chains Acquire Progressively Greater Resistance to Impact and Abrasion.

Actual case histories prove that AMSCO Manganese Chains outlast ordinary chains by more than 6 to 1 where impact and abrasion exist. For example, on one conveyor operation, ordinary chain had to be completely replaced every three months. When AMSCO Manganese Steel Chain was installed, only a small fraction of the links were replaced during a test period of over 24 months.

Users of AMSCO Chains benefit by unusual freedom from expensive chain replacement, breakage, maintenance-down-time and other problems caused by impact and abrasion conditions.

AMSCO Manganese Steel Chains have the unique ability to work-harden with use. In rough service, they develop a surface hardness up to 500 Brinell. They also acquire a hard glass-like polish that helps shrug off grinding abrasion. All AMSCO Manganese Steel products — tough when produced — possess the extra-value quality of actually increasing durability with in-use battering and grinding.

AMSCO Chains are made of Manganese Steel —the "Toughest Steel Known." They are produced in many standard and special shapes by American Manganese Steel Division—largest producer of manganese steel for all industry.

If you use chain, and desire a more durable alloy, you are invited to contact AMSCO. There's a good chance we can save you money and provide chains that will outlast your service life expectations.

Drag Line Type Chain—Mining & Excavating

AMSCO Chain Assumes Many Forms To Serve Industry. A Few Are:

Detachable Chain—Bucket Elevating

Pinlock Type with Cast-on Dog—Log Hauling

840 Series Chain—Bucket Elevating

Rivetless Chain—Mining

Clinker Drag Chain—Cement Milling

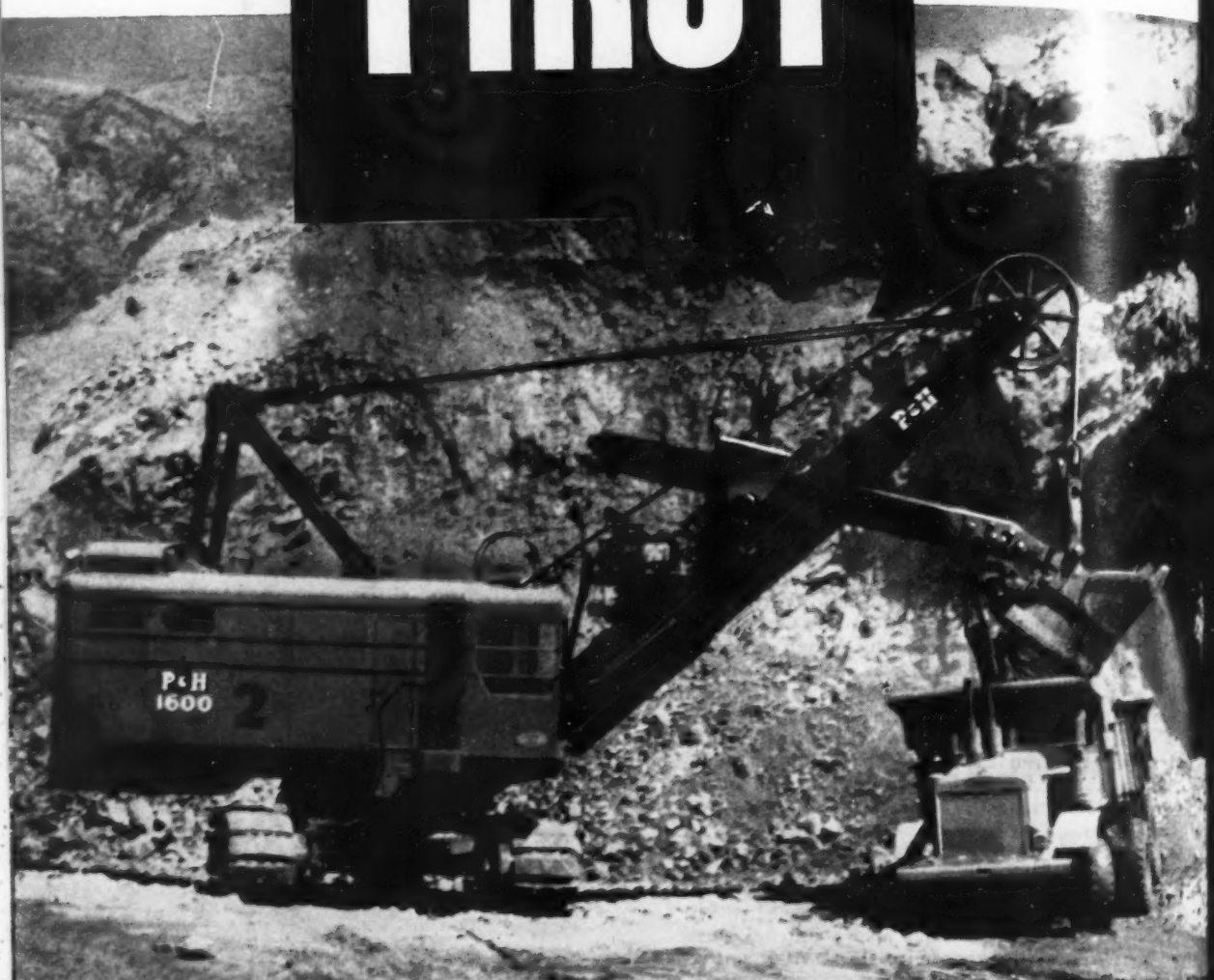
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

425 EAST 14th STREET · CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

FIRST



The first thing you see when you look into P&H Electric Shovels is new ideas—ways of doing things differently. *Differently and better!* For P&H engineering concentrates on one thing . . . cutting *your* production costs!

The result is evident in electrical equipment designed and built by P&H—especially for the purpose—not adapted for it. Stepless power regulation gives you the smoother flow of power without multiple contactors to cause trouble and replacements. There's Magnetorque* Hoist Drive, vertical swing motors, independent propel, powerful worm crowding mechanism with separate crowd motor, air-filtered cab. And there's the all-welded strength of rolled alloy steels to take year-in, year-out punishment.

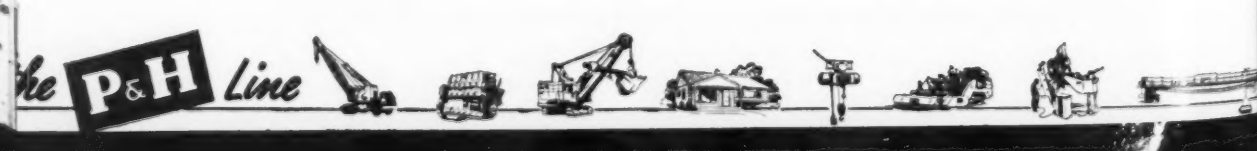
P&H leadership in electric shovel development gives you leadership in all kinds of open pit work . . . lower tonnage costs! That explains why every third P&H Electric Shovel sold is a repeat order. Get the facts.

**T. M. of Harnischfeger Corporation for electro-magnetic type coupling.*

P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN



GRAB SAMPLES From the Mail

Word from Indian Geologist

Dear Sir:

I deeply appreciate your magazine and I find it so useful and so full of a wide range of information in a nutshell that I could not think of a copy of it failing to reach me. It would not be amiss if now and then a map of the world showing more recently developed mineral resources be published in it.

I am enclosing the names of some geologists in my area that would be happy to receive copies of your excellent magazine.

K. K. Dar
Mining Geologist
Atomic Energy Commission
Government of India

Information For Lectures

Dear Sirs:

I always take a great interest in reading your magazine, and even more so now, as I am lecturing in Economic Geology at the Royal Institute of Technology. The news service is excellent and on many occasions I get first hand information for my lectures. I am thinking, for instance, of the articles about King Island Scheelite (1947) Ltd., February 1953; India's Manganese Production, August 1952; and GEOMINES tin, November 1952.

Olof H. Odman
Royal Institute of Technology
Mineralogy and Geology
Stockholm, Sweden

Forward Copy at New Address

Dear Sir:

While I was manager of the Welkom Gold Mining Company, located in the Orange Free State I regularly received your magazine.

During the last year I left the Welkom Gold Mining Company to take up the position of manager of the above company (The South African Land & Exploration Company Limited).

My address is now as above and I would greatly appreciate if you would be good enough to resume forwarding to me a copy of Mining World.

W. D. Lyle
Manager
Brakpan, Transvaal

Prediction Comes True

Dear Sir:

I was glad to see my forecast of steel derationing printed so prominently on page 61 of the March 1953 issue of Mining World. The magazine reached readers in the United Kingdom three days before the derationing was announced in Parliament.

P. J. Sergeant
London Correspondent
MINING WORLD
London E. C. 2
England

MINING WORLD

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

VOLUME 15 **AUGUST 1953** **NUMBER 9**

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COVER CIRCLE: When Eureka Corporation, Ltd. failed to recover core from a lead-zinc deposit by conventional diamond drilling methods, rotary oil well rigs were brought to the company's Eureka, Nevada property and are now taking 3½-inch-diameter core—with a 95 percent recovery—that assays $75 per ton.

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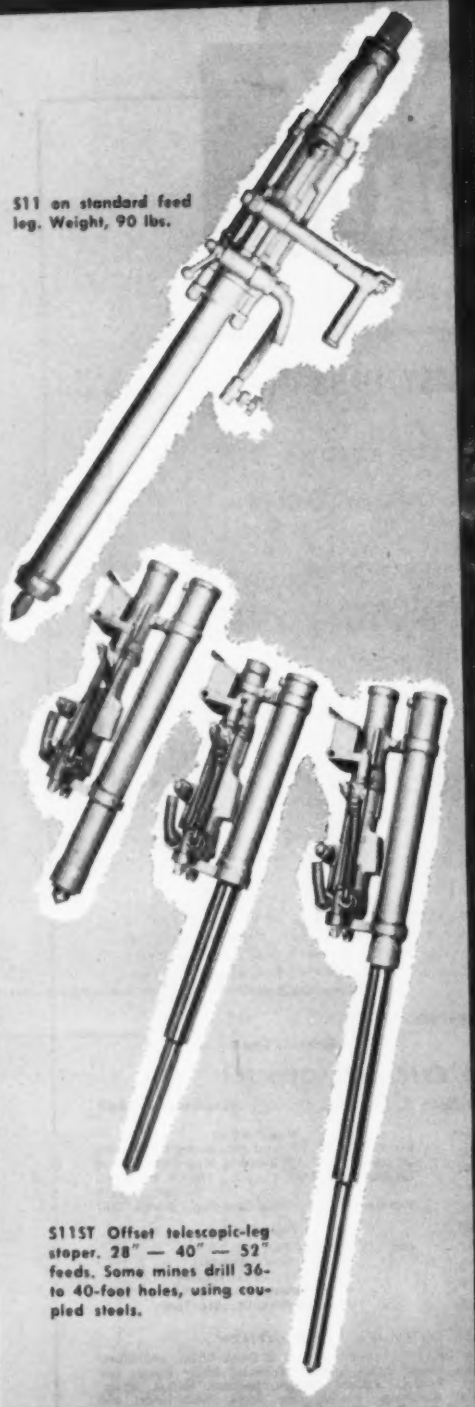


S11 on standard feed leg. Weight, 90 lbs.

S11ST Offset telescopic-leg stoper. 28" — 40" — 52" feeds. Some mines drill 36- to 40-foot holes, using coupled steels.

S11S Offset stoper.

Le Roi-CLEVELAND "Offset" Stopers

make roof bolting faster, easier

- **Complete range of sizes** for every mining condition including low coal.
- **Durability** keeps Le Roi-CLEVELAND Stopers underground.
- **Easy to handle** — fast drillers.
- **Trip rotation** lets you use the same stoper for driving roof bolts that you use for drilling.

why . . .

. stoping operations go faster and cost less, when you use e Roi-CLEVELAND Stopers

OR all raise or any uphole-work, drilling goes better with a Le -CLEVELAND Stoper on the .

Now, why is that? On the sur- e, a Le Roi-CLEVELAND looks tty much like other makes of pers. But—see a Le Roi-CLEVE- ND in action. Actually use it. en you can tell the difference. t all boils down to one thing — Roi-CLEVELAND *design*. Right re, you have the basic reason why Le Roi-CLEVELAND Stopers produce extra footage per shift . . . why tonnages are greater . . . why mining and maintenance costs are lower.

Le Roi-CLEVELAND Stopers are available in 90- and 120-lb. sizes, to meet every mining condition. Ask your Le Roi representative for detailed information on the units that meet your particular needs. See him soon.

Write for free Bulletin No. RD25.

CLEVELAND ROCK DRILL DIVISION
Le Roi Company

12500 BEREA ROAD • CLEVELAND 11, OHIO
Plants: Milwaukee, Cleveland and Greenwich, Ohio

Trouble-free performance is built right in

- End-seating valve has short trav- el. Its snappy action provides erful blow, strong rotation, and drilling speed. Air consumption ow and valve efficiency is not ected by wear.

- Air-feed relief control trigger is close to operator's thumb as he ds the handle grip. Slight pressure the trigger eases up on the air — more pressure drops the drill k slightly, or returns it to its fully ed position.

3. Inside of air-feed cylinder is polished, to provide free action and insure longer life for cup leathers.

4. Trip rotation lets the operator stop and start rotation at will — a big help in collaring the hole. It's a safety factor, too: When a steel sticks suddenly, the pull of the rotation on the operator's hand turns the hand-grip sleeve, stopping the rotation before the machine can cause injury.

5. Air-feed piston is an integral forged tube—not welded or brazed.

6. Constant blowing around the steel keeps cuttings out of the chuck.

7. Rotating sleeve and spacer are built to withstand wear and fatigue.

8. Efficient lubrication protects all surfaces, adds to the dependability of Le Roi-CLEVELAND machines.

THREE MARION 93-M SHOVELS

Harvest "Rock Cotton" in Canada

Three MARION 93-M Diesel shovels working in asbestos pits of the Canadian Johns-Manville Company, Ltd., in northern Ontario get a real workout.

They are on around-the-clock schedules in land where the mercury can drop to 60 below. The digging is all solid rock.

Two of these diesel shovels load out waste rock on both sides of the fiber-laden serpentine rock which the third machine digs. Despite the rigors of weather and terrain, each MARION turns in impressive tonnage records.

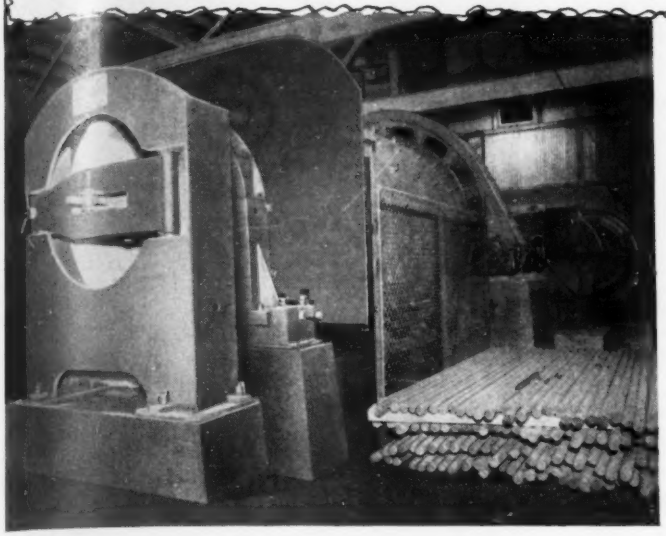
The details about 93-M strength, power and stamina to handle big assignments may point the way to a happy solution of some excavating problem for you. Why not ask your nearest MARION representative today about 93-M Diesel and Ward-Leonard electric machines?

MARION **POWER SHOVEL CO.**
MARION, OHIO, U. S. A.

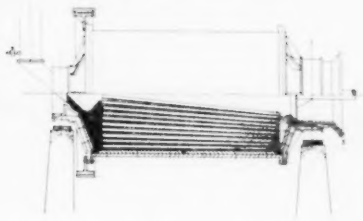
from 3/4 cu. yd. to 45 cu. yds.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

How MARCY Rod Mills Improve Fine Crushing



MARCY OPEN END LOW PULP LINE GRINDING IMPROVES FEED FOR SECONDARY BALL MILLS



The Marcy principle of low pulp line, fast discharge of mill content results in lower overall costs than when dry crushing is used... the discharge is more uniform, a higher percentage of discharge is finished product. Thus the load is lightened or capacity increased, on the final stage of grinding.

For example

7'x 12' Marcys Chosen for Fine Crushing.

A large copper-lead-zinc producer recently ordered 7—7'x12' Marcy Open End Rod Mills for crushing a 1" feed to a 10 mesh ball mill feed.

Other MASSCO products: Massco-Fahrenwald Flotation Machines, Genuine Wilfley Tables, Massco-McCarthy Hot Millers, Rock Bit Grinders, Density Controllers, Belt Feeders, Rubber Pinch Valves, Assay and Laboratory Supplies and Equipment, Complete Milling Plants.

The Mine & Smelter Supply Co.

BOX 5270, TERMINAL ANNEX, DENVER, COLO., U.S.A.
OFFICES IN SALT LAKE CITY, EL PASO, 1775 BROADWAY, N. Y. C.

REPRESENTATIVES: CANADIAN VICKERS, LTD., MONTREAL, CAN.; W. R. JUDSON, SANTIAGO, CHILE; THE EDWARD J. NELL CO., MANILA, P.I.; THE AUSTRAL OTIS ENG. CO., LTD., SO. MELBOURNE, AUSTR.; MORGARDSHAMMARS MEK. VERKSTADS AKTIEBOLAG, MORGARDSHAMMAR, SWEDEN; THE ORE & CHEMICAL CORPORATION, 80 BROAD STREET, NEW YORK CITY 4, NEW YORK, REPRESENTATIVES FOR CONTINENTAL EUROPE.

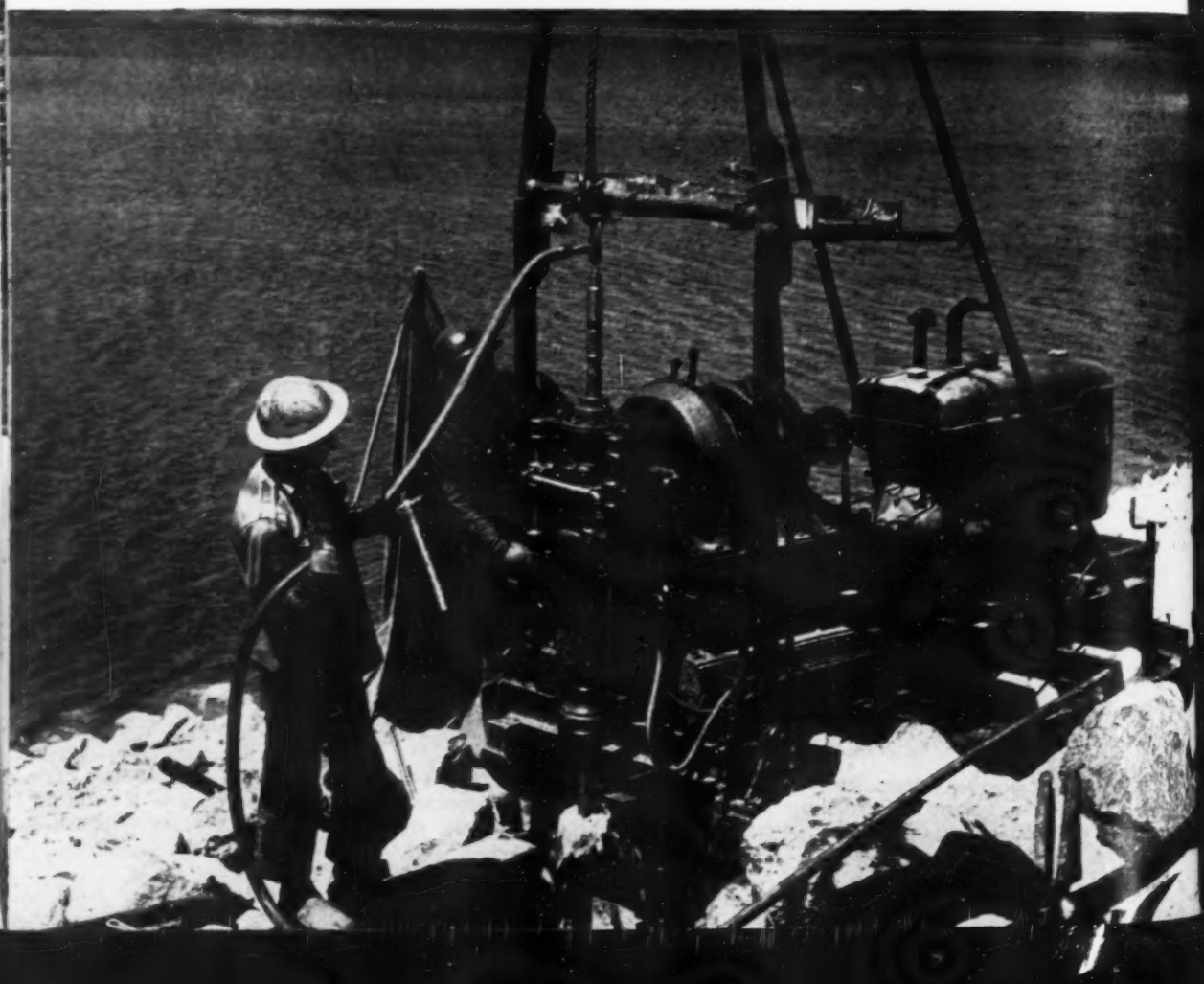
Naturally you want

TRUE CORES

. . . and you want them **FAST**

and at **LOWEST COST**

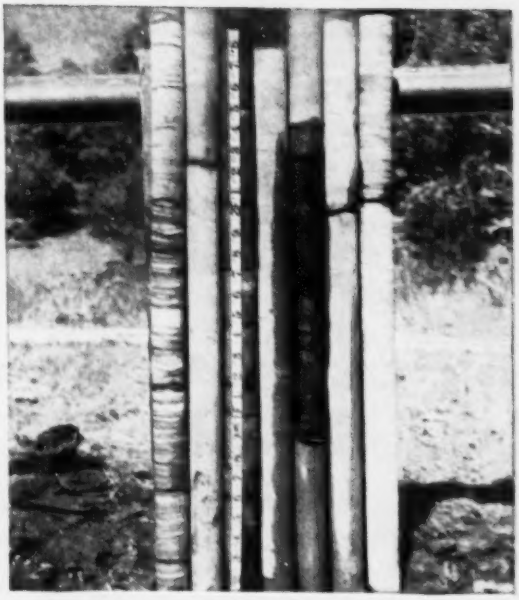
SO . . . **WHY NOT BET ON A SURE THING**



On the strength of the story told by these cores, a new mine was opened and became a big producer. With a Joy Diamond Core Drill, it was a simple matter to analyze and measure these cores and determine, precisely, the mineral content, size and value of the deposit.

Prospecting can be done at a fraction of the cost and in much less time than any other method. There are many other uses for Joy Diamond Core Drills, too. They're great for blocking out ore bodies, testing sub-surface foundations and completed structures, and drilling holes for pressure grouting, underground drainage, ventilation and gas relief.

For full details on Joy Diamond Core Drills, write for bulletins to **Joy Manufacturing Company, Oliver building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



SE JOY DIAMOND CORE DRILLING EQUIPMENT

THE JOY 22-HD is a heavy-duty drill that's rugged, portable and versatile. It's direct-driven with four-speed transmission—either hydraulic or screw-feed swivelhead. An easily-operated, rugged, but sensitive hoist that handles strings of drill pipe up to 2000 feet and operates at hoisting speeds up to 290 feet per minute. Details in Bulletin D-28.

THE JOY 12-B is a highly efficient drill that can be quickly dismantled into four compact units for convenient transportation. With a capacity of 1000 feet, its versatility and portability make it ideal for the other duties required of a sturdy drill. Available on skid or column mounting for surface or underground operation. Skid mounted model uses either hydraulic or screw-feed swivelhead. Details in Bulletin D-21.

CORE DRILLING BY CONTRACT

Complete core drill contracting service by highly skilled crews is available for mineral prospecting, blocking out ore bodies, testing foundations, drilling grout holes, etc. Write for full details.

TRUCO AND JOY-TRUCO DIAMOND BITS AND REAMER SHELLS

Sales and Resetting Service throughout the World by Joy Manufacturing Company

JOY

WAD W46

WORLD'S LARGEST BUILDER OF CORE DRILLS, ROTARY BLAST HOLE DRILLS AND MOTORIZED DRILL RIGS

To Increase Your Tonnage On Every Blasting Job

Thor

offers a Complete Selection of ROCK DRILLS

STOPERS

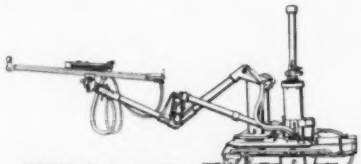
SINKER ROCK DRILLS

SUMP PUMPS

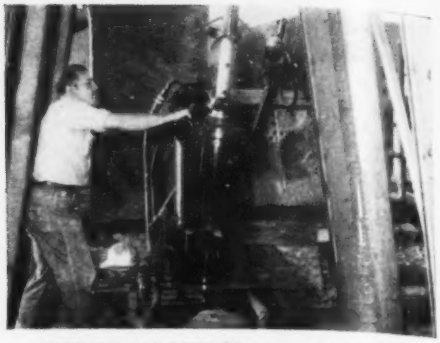
DRIFTERS

Thor Rock Drills, famous everywhere for power and durability, give an extra bonus of rock penetration when used with the new Thor air feeds—legs, bars, shell motors and the great, new track-mounted "Jumbo". For greater footage, lower air and maintenance costs, and all-around satisfaction, use Thor mining equipment. Ask your Thor distributor for a demonstration, or write for free catalog.

SINKER LEGS



DRILLING "JUMBO"



THOR DRILLING "JUMBO"—A completely modern, track-mounted carriage for speeding drifting and tunnelling operations. Air-operated roof-jack, boom, feed motor and drifter. Mounts one or two drills.

THOR SINKERS AND LEGS—Easy one-man operation for drifting and tunnelling, PLUS complete Thor dependability. Six drill models, three legs. Steel or aluminum cylinders.

THOR POWER FEED DRIFTERS—Variable speed air motors aid penetration, reduce bit breakage. Two drill models, six mountings, steel or aluminum up to 48″+48″ feed.

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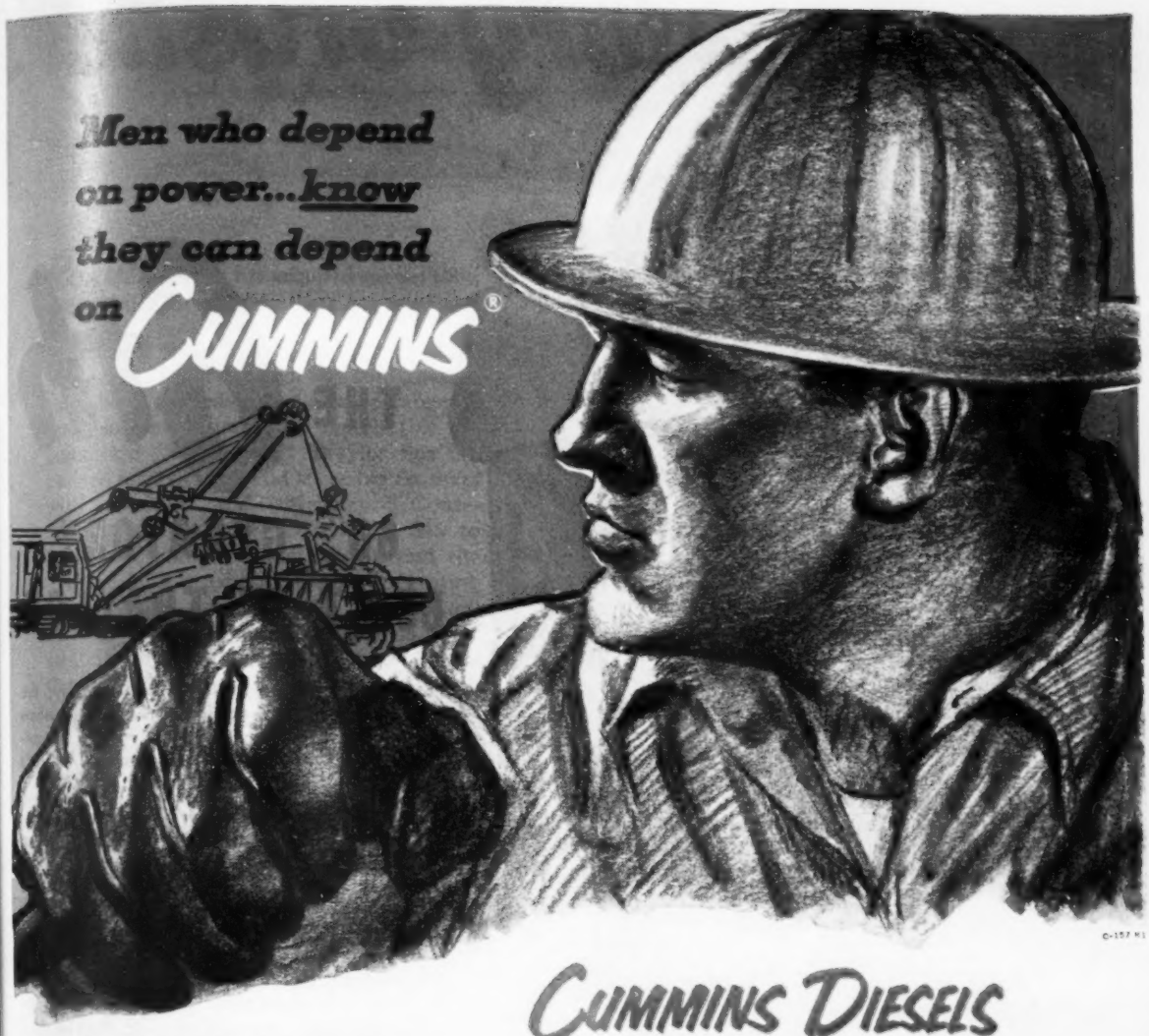

CUMMINS DIESELS

are engineered to make light work of tough jobs

You know it pays to hire the most experienced worker. In the field of rugged, lightweight, high-speed diesels, Cummins has logged more *pioneering* time than any other engine maker.

Yes, Cummins ranks as the leader in boosting diesel power, flexibility and stamina . . . reducing dead weight and bulk. The result: engines that are *tough* yet *mobile!* The story of the modern lightweight, high-speed diesel is the story of Cummins. Today, as in the past, Cummins sets the pace . . . works continuously to produce diesel engines that get more work done at lower cost, that outperform all others on every job.

Find out what a Cummins Diesel (60-600 h.p.) can do in your operations. Your Cummins dealer is ready to give you *all the facts.* Call him today.

Write for **FREE** informative booklet **"The Dependable Diesel"** demonstrating Cummins' performance in all power jobs.

Leaders in rugged, lightweight high-speed diesel power!

CUMMINS

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

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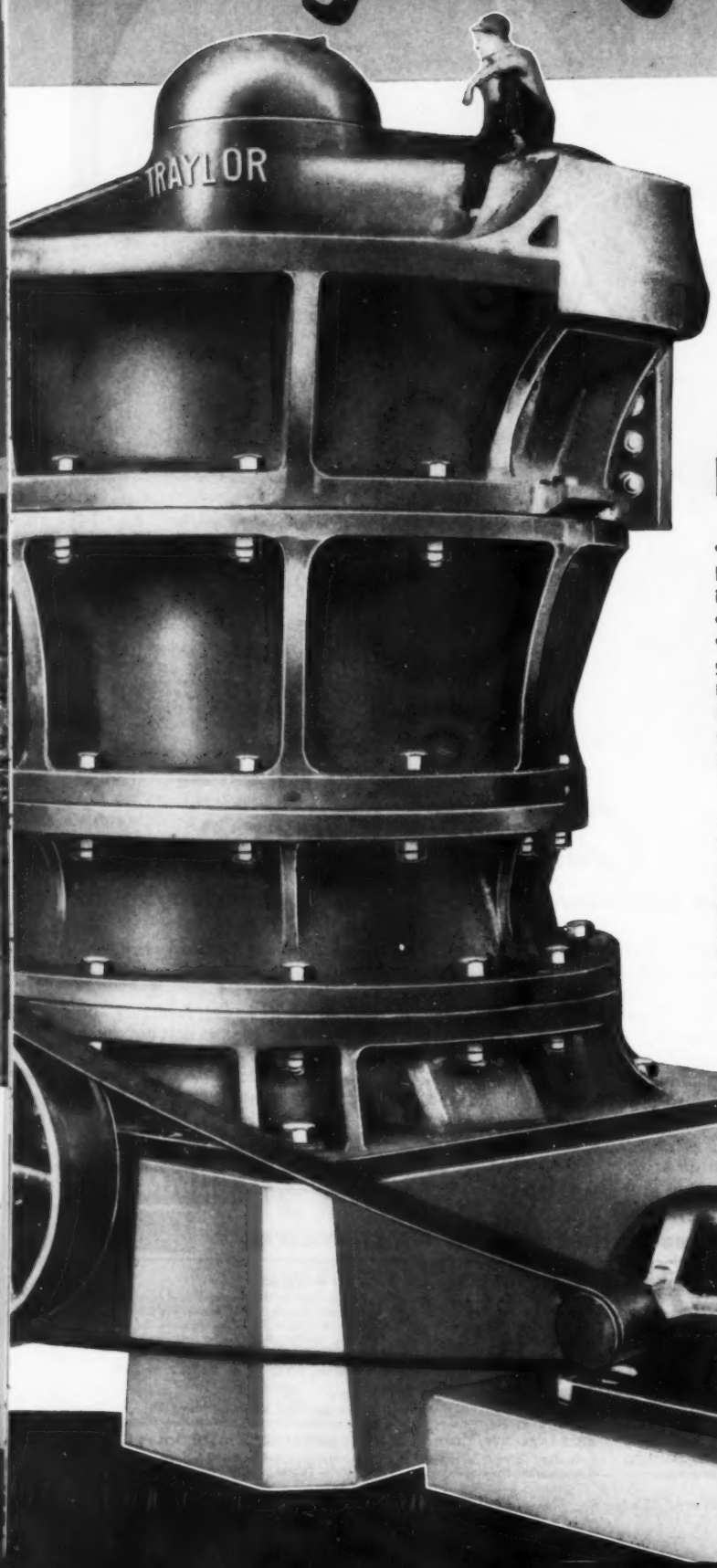
(6-2-53)

BIG Gyratory Crushers



THE 6th 60" GYRATORY BUILT BY TRAYLOR

"Traylored" to produce 30,000 tons per day, the latest of Traylor's super-size 60" Gyratory Crushers is on its way to the famous copper mine at Chuquicamata, Chile. This crusher is equipped with Traylor's original curved concaves and bell head.

Some idea of the weight of this gigantic machine can be judged from the relatively small eyebolt used to lift the shaft. It weighs over half a ton. The cast steel frame of the crusher is over 5" thick at several points.

Traylor built the first successful 60" Gyratory in 1919 . . . 34 years ago. It proved that a gigantic crusher with high hourly capacity could effect amazing production economies. This first 60" was sold to a Michigan limestone producer. Because of its outstanding efficiency, this same customer purchased their second 60" Traylor Gyratory four years later. Of these 60" crushers, three are in Michigan, one in Arizona, one in England and one in Chile. Capacities up to 3500 tons per hour.

A Traylor LEADS TO GREATER PROFITS

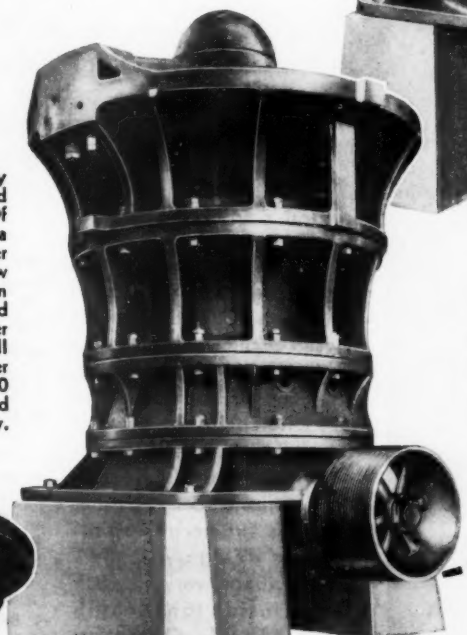
Since 19

"Traylor-MADE"

Result: Traylor has acquired special skills and facilities for building these big machines.

With 38 of these huge Gyratory Crushers in the field, Traylor design and construction have been proved under a wide range of operating conditions. To match this accumulated "know-how," Traylor has expanded facilities to build these big crushers with precision and efficiency. Consequently, the producer who needs 645 to 3500 tons hourly production will find the Traylor TC a crusher of unusual operating economy and dependability. Write concerning your requirements. Let us show why it pays in the long run to buy a Gyratory "Traylored" to your individual needs.

EIGHT 54" Traylor Gyratory Crushers are in the field; four in Canada, one in England, one in Mexico, one in Michigan and one in Nevada. These crushers are used to help produce cement, nickel, copper and iron. The Traylor 54" Gyratory has hourly capacities from 1400 to 2240 tons.



FOUR 48" Traylor Gyratory Crushers have been built and TWO are in the works. Of those in the field, one is in a Pennsylvania ore mine, another is crushing trap rock in New Jersey, still another is in Minnesota on iron ore and the fourth in Nevada on copper ore. The two in the works will be crushing iron ore and copper ore. Capacities up to 1980 tons per hour are obtained with the 48" Traylor Gyratory.

EIGHTEEN 42" Traylor Gyratory Crushers are in a wide range of service. One is in Chile, two in Canada and the rest dispersed over 14 different states. The 42" Traylor Gyratory provides capacities up to 1290 tons per hour.

FOR MORE INFORMATION
mail this coupon today to . . .

TRAYLOR ENGINEERING & MANUFACTURING CO.
1533 MILL ST., ALLENTOWN, PA.

Send me complete facts about the Traylor TC Gyratory.

Name: _____

Position: _____ State: _____

Company: _____

Address: _____

Sales Offices: New York • Chicago • San Francisco
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e 19 ulor has built 38 of the world's biggest crushers

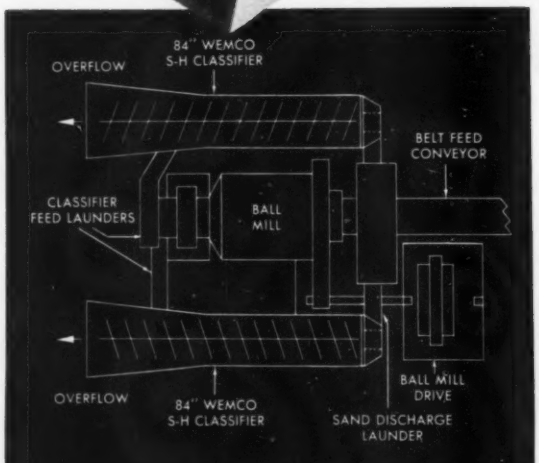
12 84" WEMCO S-H CLASSIFIERS

chosen for the

WHITE PINE COPPER PROJECT

One of 12 Wemco S-H Classifiers soon to be installed for White Pine Copper Co. at White Pine, Michigan. All mining and processing operations for this large project were designed and engineered by the Western-Knapp Engineering Co., division of Wemco.

With expected annual production of 75 million pounds, White Pine ranks as one of the most important copper projects now being developed. To serve as a vital part of the primary grinding circuit, White Pine selected twelve 84" Wemco S-H Classifiers. Typical of the magnitude of this project is the fact that these 84" units, now under construction, are the world's largest simplex classifiers.



- As shown in the accompanying diagram, two Wemco S-H Classifiers will be operated in closed circuit with each of six ball mills, 12' 6" x 13' in size. The minerals to be produced are chalcocite and minor amounts of native copper occurring in sandstone and shale deposits. Each classifier is of the submerged spiral type of design with 84" double ribbon, variable pitch spiral. Inside tank length totals 41' 9". Operating slope is 3½" per foot.

Whether Your Classifier Needs are Large or Small
WEMCO DESIGN Offers You These METALLURGICAL ADVANTAGES

- **Greater Overflow Capacity** – up to 25% more effective pool area.
- **Greater Raking Capacity** – up to 100% greater sand conveying capacity.
- **Sharper Separation** – less oversize in the overflow and less undersize in the sands.
- **Balanced Performance** – wide choice of tanks and spirals for correct performance under any condition.
- **Better Drainage** – drier sand for easier conveying and close-circuiting.

Put Wemco to work on your classification problems. Write today for literature and additional information. No cost or obligation.

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WESTERN MACHINERY COMPANY
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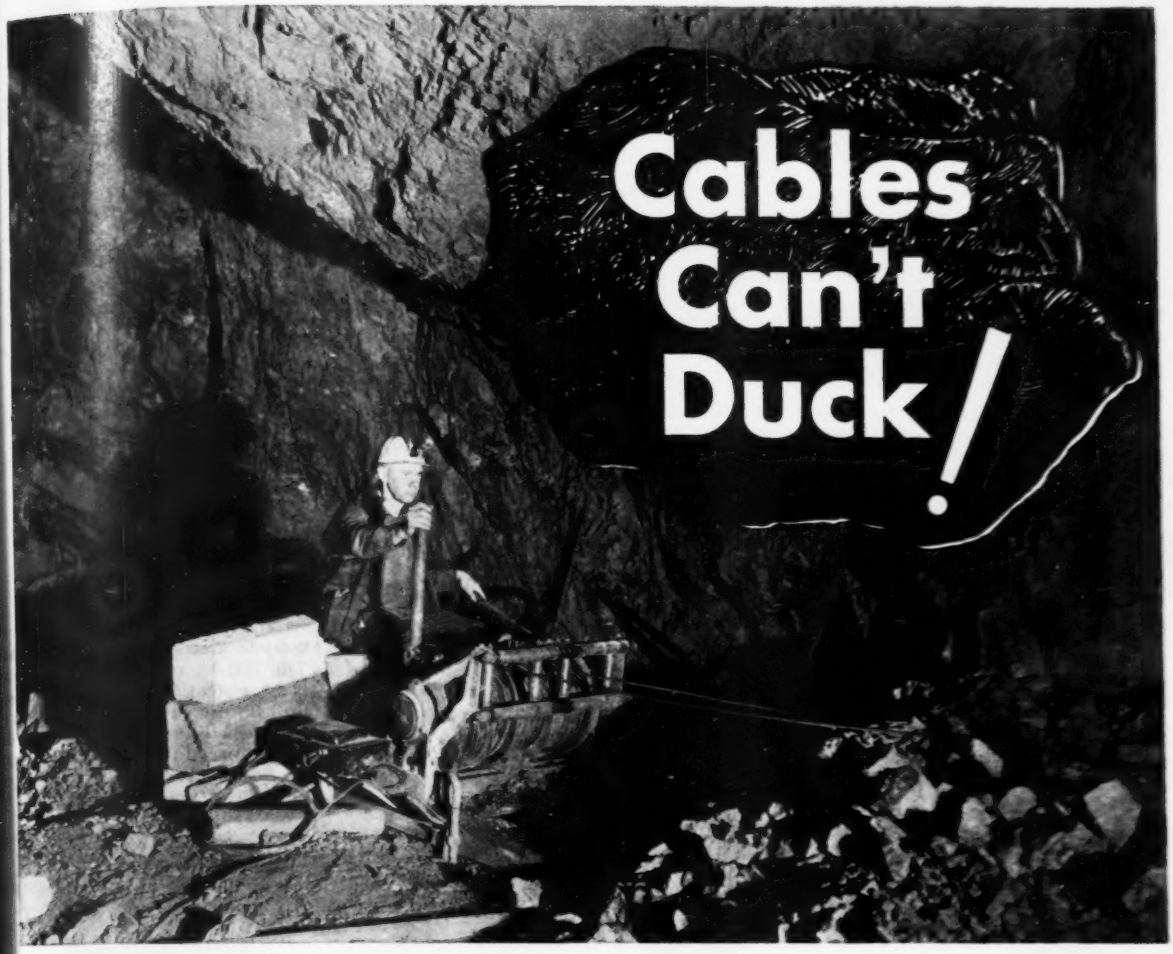


Portable cables for slusher hoists can't duck flying pieces of ore, spalling rock, water and mechanical abuse. They have got to stay put and take it. For these reasons you need more than a good power cable; you need the best that money can buy. Cables that can stand up under these tough operating conditions are the only kind that can help turn in a profit. The profit-making, loss-preventing kind is TIREX.

Simplex-TIREX power cables have a *tough, cured-in-lead, selenium-neoprene armor* to assure extra-long life. This special armor gives balanced resistance to abrasion, water, grease, oil and flame. It is this special balance of properties that makes TIREX Cables last longer and thus enables you to scrape more tons of ore.

Remember to specify and get Simplex-TIREX Cables for all your portable operations, including slusher hoists. These cables are marked "Simplex-TIREX" for your protection.

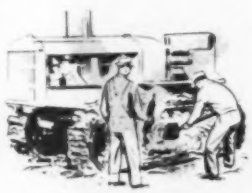
Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

Advance design features make Allis-Chalmers Tractors performance leaders

It takes truly modern equipment to keep pace with today's stepped-up demands — and do it at an operating cost which insures fair and consistent profits. The line of Allis-Chalmers crawler tractors has been designed and built completely new since the war, with the kind of advanced engineering that delivers big-capacity performance at a minimum of maintenance expense.

This forward progress is a continuing program. Additional improvements are constantly being incorporated into the HD-5, HD-9, HD-15 and HD-20 tractors. If you are in the market or just interested, see your Allis-Chalmers dealer for all the inside-facts that have proved so popular with owners as well as operators and mechanics.

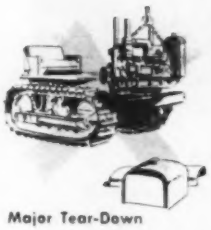


Daily Lubrication

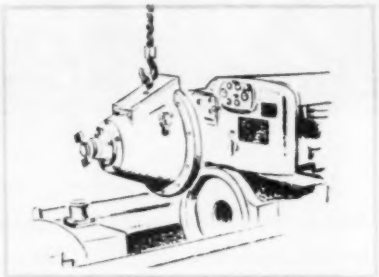
1000-hour Lubrication. Operate six months on a 40-hour week basis with just one lubrication of truck wheels, front idlers and support rollers. Positive seals protect from dust, loose sand, soft ground, mud or water. You gain working time, save labor and lubricant costs, eliminate costly damage from greasing neglect.

Ordinary Steering Clutches

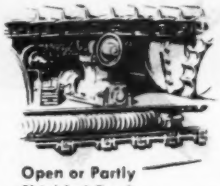
Hydraulic Steering and Self-Energizing Br
The HD-15 and HD-20 have hydra booster steering; operator exerts on to 5 lb. pressure on controls, so he small tractor maneuverability from th 27,850 and 41,000 crawlers. Self-ener ing brakes need less pedal pressure hold with a firm, uniform grip.



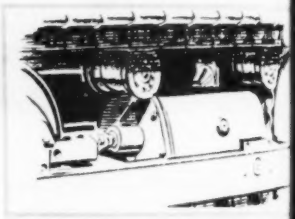
Major Tear-Down



Unit Servicing. No need to remove transmission or engine, radiator, grille, etc., when servicing or removing an Allis-Chalmers master clutch. The unit assembly principle also applies to final drive gear, transmission, steering clutches, engine and truck frame. Save hours of costly service and down time.

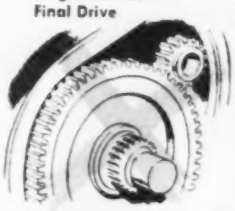


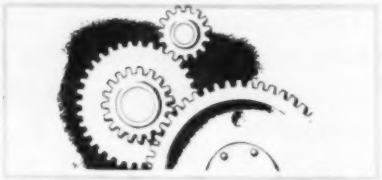
Open or Partly Shielded Track Release Mechanism



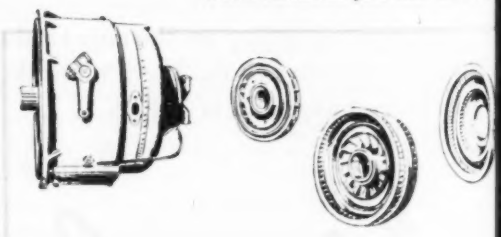
Oil Enclosed Track Release Mechanism.
erating in oil and *sealed* against dir moisture, Allis-Chalmers track re mechanism seals out mud, ice and de Because it's completely sealed, re mechanism is in working condition times — providing positive prote when obstacles jam into the track

Single Reduction Final Drive





Double Reduction Final Drive. With smaller gears and shorter shafts, double reduction final drives provide better bearing and gear alignment. The "live" axle permits smaller, more serviceable seals. Equally important, double reduction drive provides for smooth, clean bottom construction and the extra ground clearance so necessary on rough terrain.



Hydraulic Torque Converter Drive. The HD-20 is the only c tractor where torque converter is standard equipment part of the basic design. Torque converter gives greate load capacity because this unit automatically balances speed to the load. And with most shifting eliminated, t far less operator fatigue.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

S-A CONVEYING Systems CUT PORT TIME and COSTS for Ore Ships

Another example of S-A engineering skill at work. Here iron ore is stock-piled continuously and then reclaimed exactly as needed, for loading ships with least delay.

No matter what *your* conveying problem may be . . . Stephens-Adamson engineers have the right answer. They have proved during more than 50 years experience in the bulk materials handling field that their knowledge, plus S-A equipment, gives you the right combination for moving more materials at the *lowest cost per ton*. Write today for complete details!

SAMAR MINING COMPANY
SAMAR, PHILIPPINE ISLANDS

Ore comes 5½ miles by rail car from the mine. A belt conveyor picks it up and stock-piles it by means of an S-A tripper. A second belt conveyor, mounted on a specially built pier, reclaims the ore and carries it out to deep water where boats can dock. At the pier-head a shuttle conveyor discharges into the ships' holds. The system handles about 100,000 tons in a 3-month period, even in the heavy rain typhoon season.

Belt Conveyors
Belt Trippers
Belt, Pan & Plate Feeders
"AMSCO" Steel Pan Feeders
Ship Loading Boom Conveyors
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SEALMASTER Ball Bearing Units

Write for a bulletin on any of the above.

STEPHEN S-A DAMSON MFG. CO.

13 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Another Example of
Profitable Non-Metallic Beneficiation
with Heavy-Media Separation

Read How

Kaiser Aluminum and Chemical Corporation Up-grades Dolomite, Reduces "Selective Shoveling," Increases Output and Improves Quarry Efficiency with this pre-fabricated H.M.S. Plant

Kaiser Aluminum and Chemical Corporation imposes a very tough specification on its Nativadad (California) Dolomite Plant—less than 1% silica and not less than 98% dolomite from a deposit of dolomitic limestone intruded by large dikes and sills of high-silica granite!

To produce acceptable kiln-feed it had been necessary to by-pass large dikes and sills or to mine out and discard these high-silica intrusives as waste. "Selective shoveling" made quarrying operations, difficult, costly. At one time, only 38% of the mined material was usable. Beneficiation, too, posed a problem because the specific gravity of acceptable product is within 0.10 of the high-silica waste.

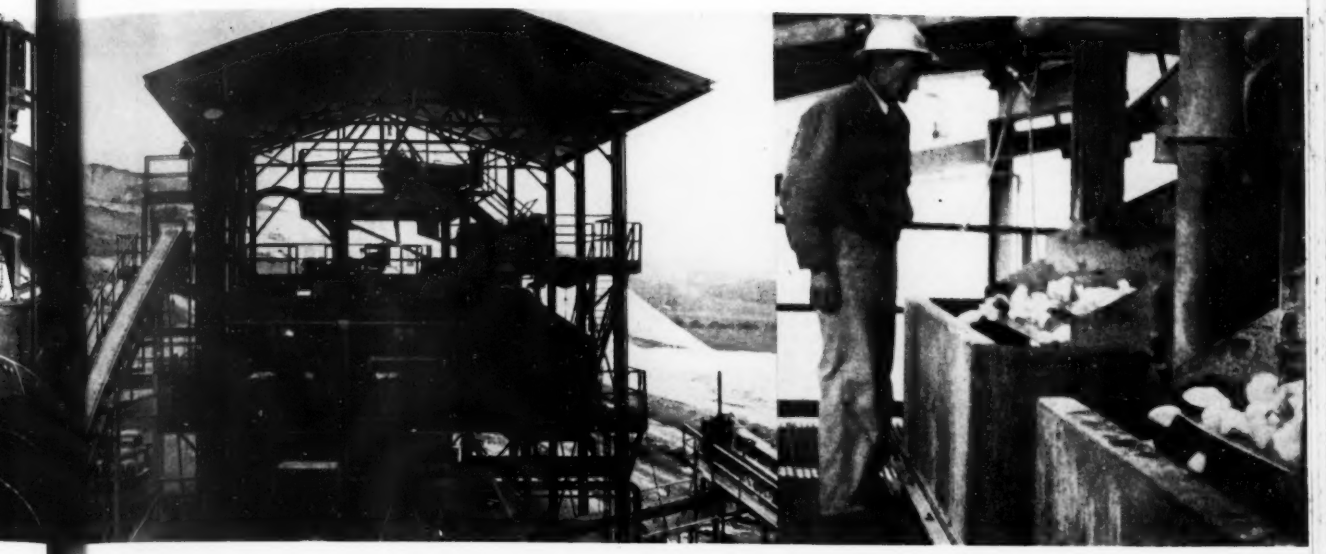
To solve this difficult operating and economic problem, Kaiser installed a 250 tph Heavy-Media Separation plant. Result: A more uniform, low-silica product; better kiln operation, and lower costs all along the line. Typical analyses of end product now show silica approximately 0.3% from a feed running as high as 7.7% and averaging 2.7 SiO_2.

Over 55% of the quarry output now becomes usable kiln feed . . . a marked gain in quarry efficiency. Ore reserves have been increased. Lower-grade material can now be beneficiated. "Selective shoveling" has been materially reduced with concurrent gains in output and quarry costs.

Treating 4 x ¼" feed with a ferrosilicon-magnetite mixture as the separating medium, this pre-fabricated Heavy-Media Separation plant operates at 2.65 specific gravity. Medium-loss averages well under a half-pound per ton of kiln-feed recovered. Capital costs were minimized by pre-fabricated construction. Operating and labor costs are low.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION 30 ROCKEFELLER PLAZA NEW YORK 20, NEW YORK



This is but one of many examples of non-metallic minerals now being beneficiated by Processes and Reagents offered by Cyanamid. Quickly and at low capital cost, you may be able to improve output, cut costs or make "sub-marginal" deposits workable through accurate, low-cost concentration employing one of these processes.

Cyanamid offers a choice of processes covering a full size-range: Heavy-Media Separation, 6 x ¼"; Dutch States Mines Cyclone Separator, ⅜" x 65 mesh, and Froth Flotation, 65 mesh x 0. Test results, design data and operating experience are available to assure predictable performance in minimum time at the lowest cost.

First step to more profitable operation is a discussion of your problems and objectives with a Cyanamid Field Engineer. Your letter or telephone call – or the convenient coupon – will have prompt and intelligent attention.

☐ *We are interested in data on the beneficiation of the non-metallic minerals ringed below:*

ANDALUSITE	FLUORSPAR	KYANITE	RHODOCHROSITE
BARITE	GARNET	MAGNESITE	SALT
CEMENT ROCK	GLASS SANDS	MANGANESE	SILLIMANITE
COAL	GRAPHITE	MICA	SCHEELITE
CHROMITE	GRAVEL	OLIVINE	SPODUMENE
DIAMONDIFEROUS GROUND	GYPSUM	PEARLITE	VERMICULITE
	ILMENITE	PHOSPHATE ROCK	WOLFRAMITE
FELDSPAR	IRON OXIDES	POTASH	(OTHER)

☐ *Send a copy of "Mineral Dressing Notes #19– Heavy-Media Separation Processes for Mineral Concentration"*

Name_____

Address_____

_____

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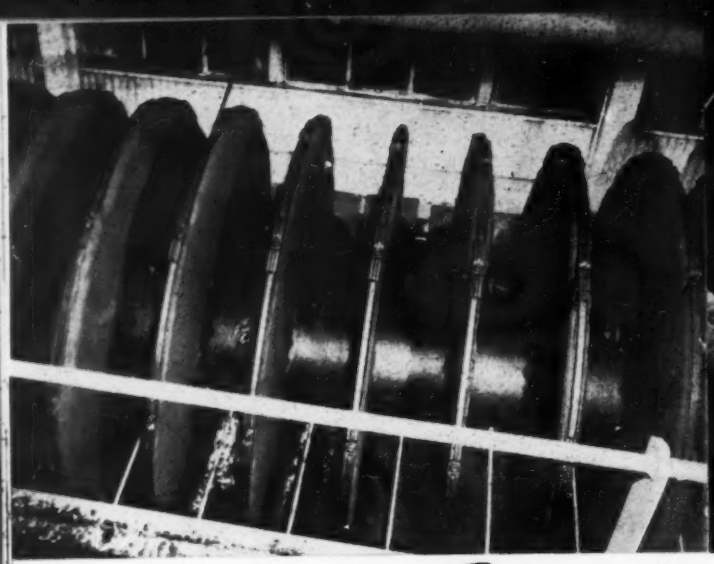


Eimco Agidisc Filters for Better Production on Fast Settling Slurries

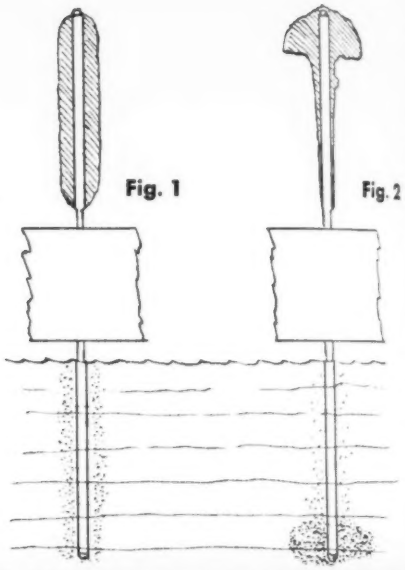
Copper concentrates being fed to filters in one of the country's largest copper producing plants are being dewatered faster with lower cake moistures and in greater tonnages per square foot of filter area.

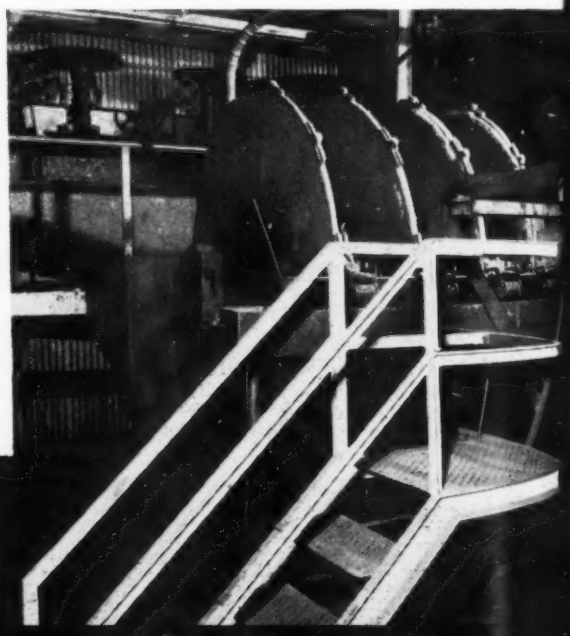
This is typical of Eimco designed and built equipment. While Eimco plants have built standard type disc filters dating back to the original disc type filters and many are still being sold for slurries that DO NOT have fast settling particles, Eimco was first again in developing a disc to handle slurries that DO have fast settling solids.

Eimco Agidisc Filters placed side by side with other disc type filters of standard design running on the same feed and under the same conditions show that Eimcos produce from 20% to 25% additional tonnage per sq. ft. of filter area with 1½% to 2% less moisture in the cake.

See Fig. 1 for sketch of section through Eimco Agidisc and Fig. 2 for sketch of section through an ordinary disc filter. Eimco Agidisc produces a smooth evenly distributed cake free of cracks and easily discharged so that bags remain free and give greater bag life with the removal of the abrasive action in settled solids in the bottom of the tank.

Eimco's more than half century of service to the process industries gives them the experience to design and build better filters to do a better job for you. Your inquiries on filtration problems will receive immediate and individual attention. Write today for more information.





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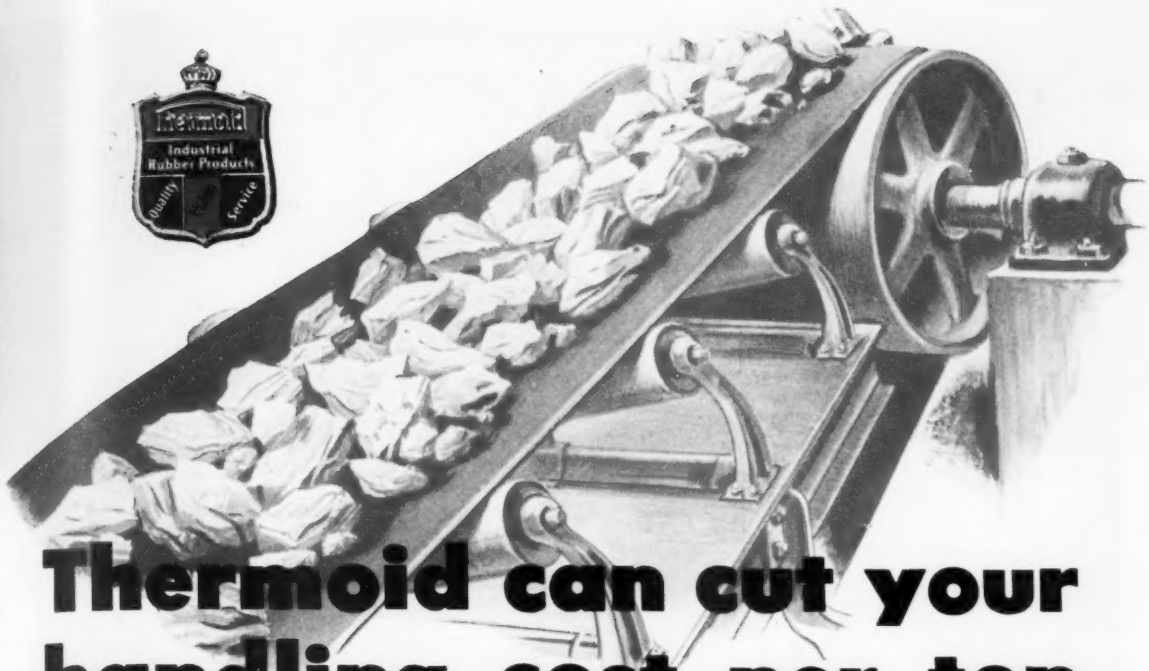


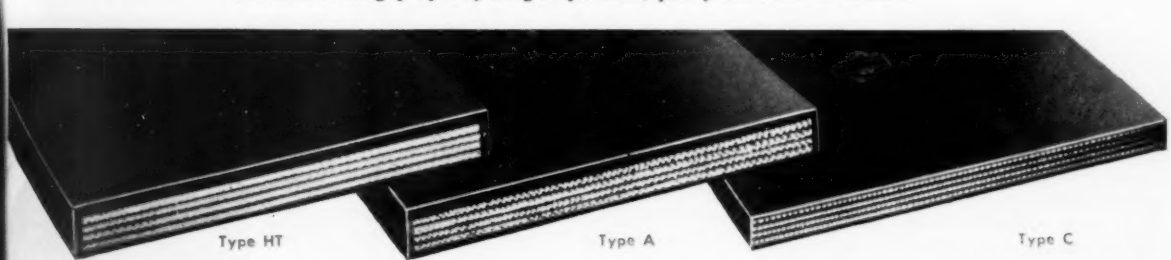
Thermoid can cut your handling cost per ton

Regardless of the weight, abrasive action or temperature of the materials you handle, there's a Thermoid Conveyor Belt that will stay on the job longer, reducing your handling cost per ton.

Thermoid Conveyor Belting for mining, quarrying or heavy construction work is designed for maximum service in these specific uses. Strong cotton fabrics, thoroughly impregnated with high test rubber friction, are combined with tough, wear-resistant rubber covers. Welded together under extremely high pressures to assure exceptionally strong, durable belting.

Your Thermoid Distributor can help you select the belt best suited to your needs. If your problem is unusual, he'll call an experienced Thermoid Sales Engineer.

Thermoid Belting specifically designed for mine, quarry and construction work:



For highly abrasive granite, flint rock, quartz ore, etc.

For slag, lime rock, crushed stone and hot material.

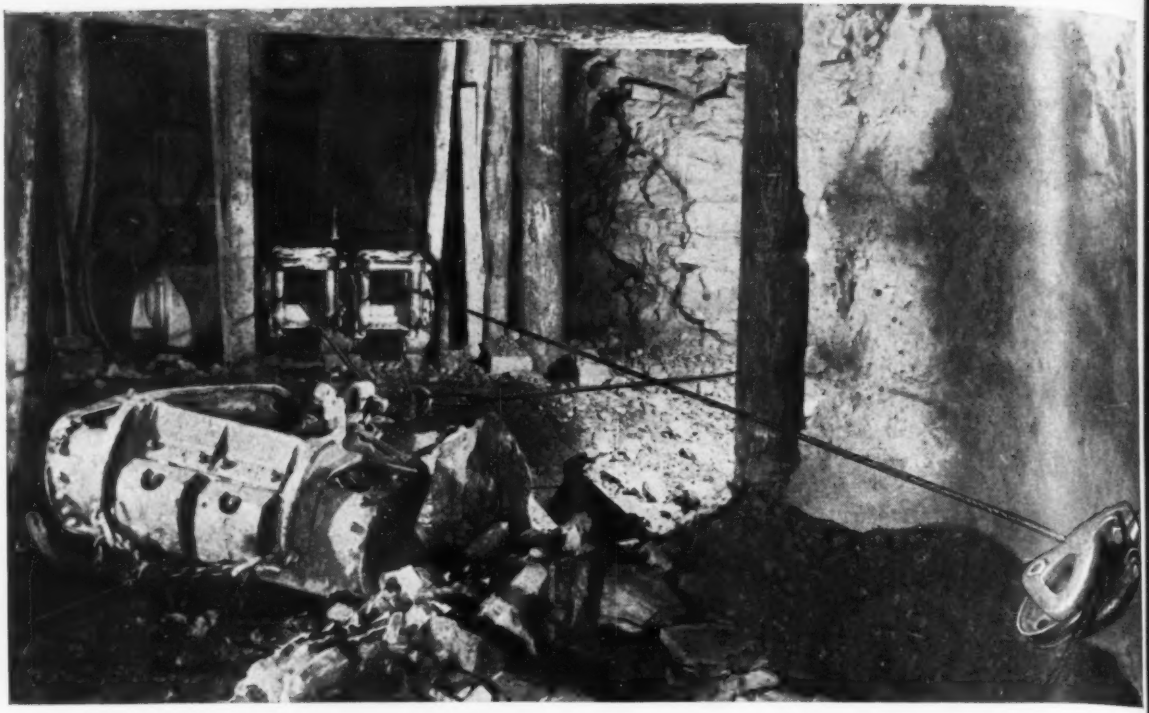
For sand, gravel, loam and finished cement.

Write for Thermoid Conveyor Belting Catalog #3679, containing full engineering data.

Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

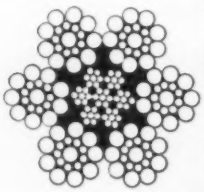
Offices and Factories: Trenton, N.J. Nephi, Utah



Here's your best slusher rope buy!

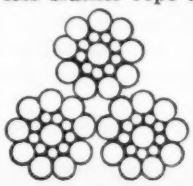
The rugged conditions of slusher service call for specialized ropes, engineered to suit the job. Few applications for wire rope involve the severe crushing, jerking, heavy loading, and abrasion to which these ropes are subjected. This is a job for Tiger Brand Monitor Steel special slusher ropes.

TIGER BRAND 6 x 19 Seale Excellay with a wire core is the "work-horse" slusher rope. It offers the best combination of strength, crushing resistance, abrasion resistance, and flexibility for average slusher operations.

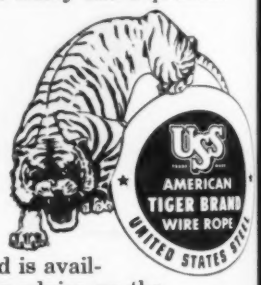


All slusher ropes should be specified Excellay—produced by the preforming process which increases flexibility, resists kinking, and keeps protruding broken wires to a minimum. Because broken strand ends don't unlay like ordinary rope, Excellay preformed ropes can often be salvaged after damage which would ruin others.

TIGER BRAND 3 x 19 Seale Excellay coreless slusher rope is preferred by many operators for use in exceptionally tough conditions where rope drags constantly on broken chunks or frequently gets buried in coarse muck. Its large strands and high crushing strength provide extra ruggedness.



The many extra qualities of Tiger Brand Monitor Steel mean lower mining costs. That's why it's your best slusher rope buy. It comes in a type and size to meet every mining application and requirement.



Monitor Steel has no equal for mining-rope applications and is available only in U·S·S American Tiger Brand Wire Rope. For advice on the best type of Tiger Brand Monitor Steel Wire Rope for your mining-rope jobs, you're welcome to the services of a Tiger Brand Field Specialist. Contact your local distributor or write to the Columbia-Geneva Steel Division, United States Steel Corporation, 1403 Russ Building, San Francisco 6.

USS

U·S·S TIGER BRAND Wire Rope

Columbia-Geneva Steel Division, United States Steel Corporation, San Francisco
In the East: American Steel & Wire Division, Cleveland, Ohio

UNITED STATES STEEL

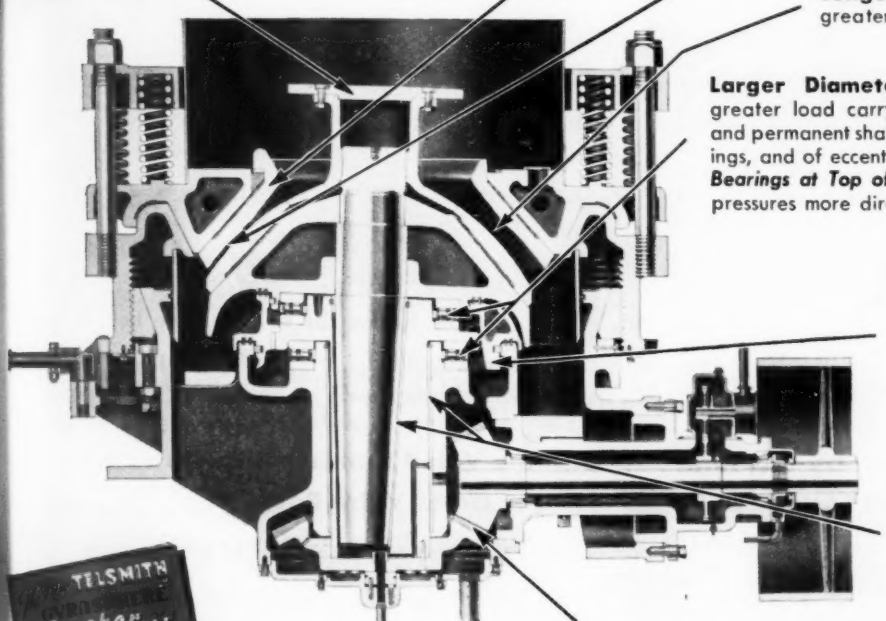
Outstanding FEATURES OF THE TELSMITH® *Gyrasphere*®

Feed Distributor gives an even distribution of the feed around the entire feed opening, resulting in a more uniform crushed product.

Gun-Lock for Holding Concave Ring — Automatic self-tightening, requires no bolts, and is easier to change.

Longer Parallel Crushing Zone gives a finer, more uniform product with a larger percentage down to size.

Longer Crushing Stroke gives greater capacity and less packing.



Larger Diameter Roller Bearings with greater load carrying capacity. Give perfect and permanent shaft alignment in eccentric bearings, and of eccentric in main frame. ***Both Roller Bearings at Top of Eccentric*** carry all crushing pressures more directly into heavy main frame.

Patented Rotary Seal with piston ring and labyrinth seals, gives most perfect protection against entrance of dust or water, or loss of lubricant.

Higher Eccentric Bearings give more bearing area in the upper zone of greatest crushing pressures, assuring more permanent shaft and eccentric alignment and longer bearing life.

Send for Bulletin No. 274

Main Drive Gear At Bottom of Eccentric assures more perfect and permanent alignment of gear and pinion, giving smoother running and longer life for both gear and pinion and less strain on countershaft bearings.

Y-12

STYLE FC
FINE CRUSHING

SMITH ENGINEERING WORKS, 4034 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Mine & Smelter Supply Co. Denver 17, Colo.
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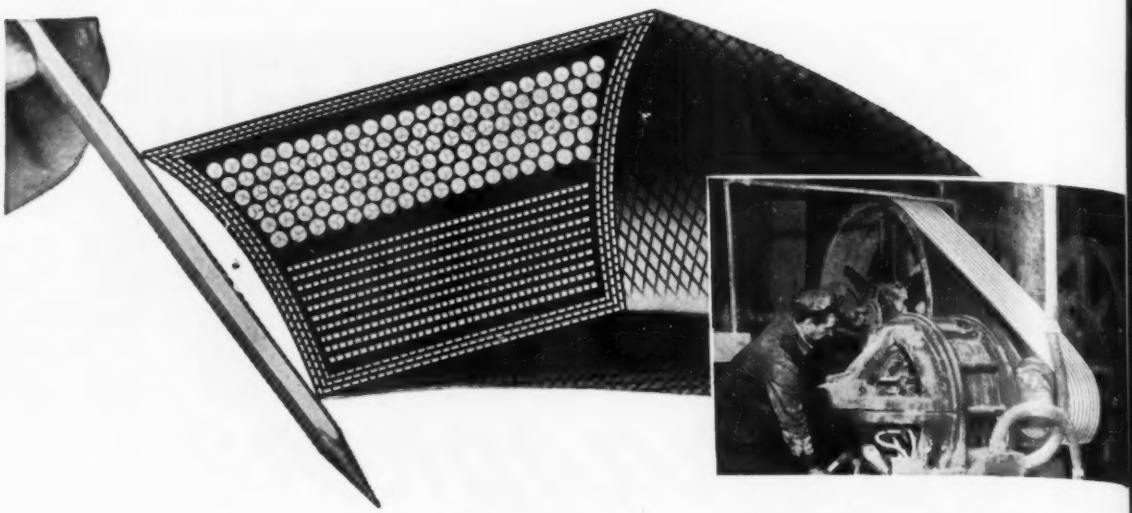
Mines Eng. & Equip. Co. San Francisco 4, Calif.
Robert S. Bailey 816 W. 5th St., Los Angeles 17, Calif.
Lee Redman Equip. Co. Phoenix, Arizona
The Sawtooth Company Boise, Idaho
General Machinery Co. Spokane 1, Wash.
Clyde Equipment Co. Portland 9, Ore. Seattle 4, Wash.
Gordon Russell, Ltd. Vancouver, B. C.



Gates V-Belts are built with CONCAVE SIDES

(U.S. PATENT NO. 1813698)

...that's why they last longer!

If you want lower V-Belt costs, just make this simple test...pick up *any* V-Belt and bend it as if it were going around a pulley.

As the belt bends, grip its sides between your fingers and thumb.

If the belt has *straight sides* you feel the sides bulge out. This forces the sides of the belt to press *unevenly* against the V-pulley . . . and you get concentrated wear at the points shown by the arrows.

Now, try this same test with the V-Belt that is built with CONCAVE SIDES —the Gates Vulco Rope.

As this belt bends, you can feel the CONCAVE SIDES *fill out* and become perfectly straight.

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope and the CONCAVE SIDES therefore mean longer belt life and lower V-Belt costs for you.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the Gates Vulco Rope!

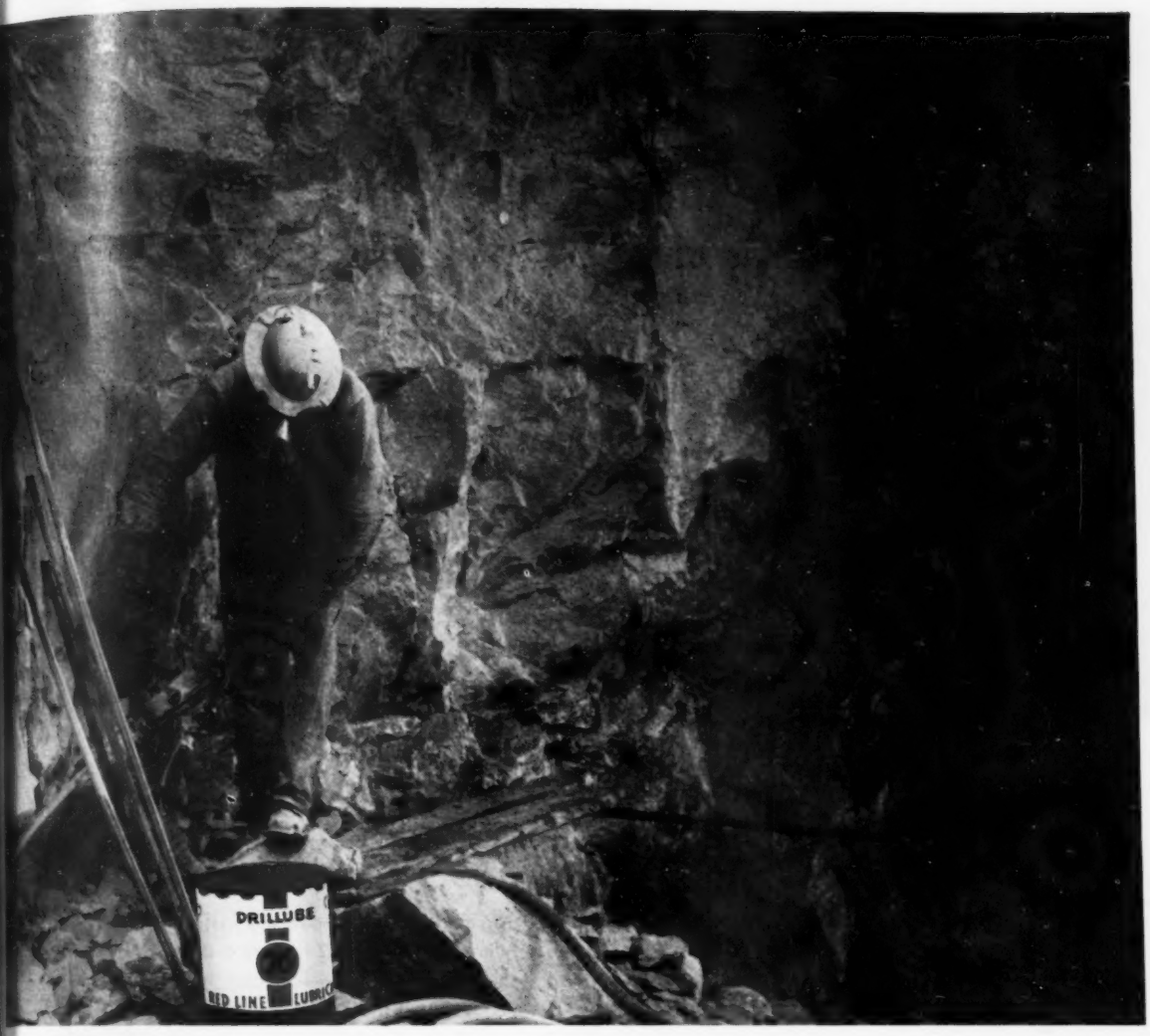
Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-535

V-Belts — Hose
Molded Rubber Goods
for industry
World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.



DRILLUBE Stops "DRILL FOG"

Drill fog is an expensive work stopper. Even the toughest worker can't take the sickening oil fumes.

DRILLUBE air drill lubricant, with exclusive ingredients, ends the problem.

Costly pneumatic tools get full protection with DRILLUBE, too. Its tough film keeps water away from precision parts, prevents the clash of steel against steel.

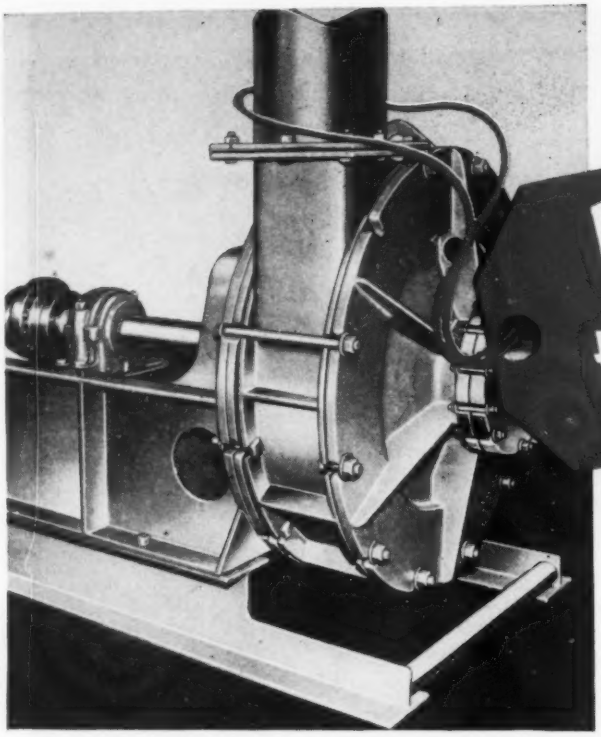
Uniform flow guarantees steady, complete lubrication of both hand and line-oiled equipment.

Other advantages: high flash point eliminates fire dangers, low cold test stops icing action of compressed air, low consumption rate means greater economy.

To get DRILLUBE, call your local Union Oil representative or write the nearest office:

LOS ANGELES: Union Oil Building • NEW YORK: 45 Rockefeller Plaza • CHICAGO: 1612 Bankers Building
CINCINNATI: 2111 Carew Tower Building • NEW ORLEANS: 917 National Bank of Commerce Building

UNION OIL 76 COMPANY OF CALIFORNIA



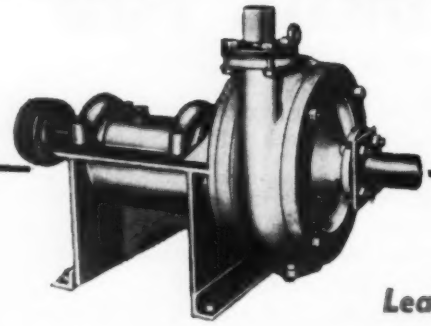
Built to Meet the "Acid" Test

VACSEAL 8 inch PUMP

The pump that gives every protection against corrosives that stainless steel and thick gum rubber can provide

There is a Vacseal Pump designed for any type of use or any size of operation. All designed and built for highly efficient service.

STANDARD and VERTICAL



Built for acid service, this newly installed 8-inch Vacseal Pump will operate 24 hours a day, with capacity to handle 3,000 g.p.m. 150-foot heads and 10- to 12-foot suction lifts. Fabricated design, with welded steel construction, provides light weight sections and room for the acid-proof protection of gum rubber that is ½ to 1½" in thickness.

The stainless steel shaft sleeve and gland bushing are replaceable. Temperatures to 180° F. Dimensions: 10' long, 5½' high, 4' wide. Weight: 4800 pounds.

Write today for full details on VACSEAL . . . the pump that requires NO SEALING WATER, the pump that has no peer for rugged use and low upkeep.

Leaders in Experience & Service

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Agents In All Principal Foreign Mining Districts

CONSULTATION • ORE TESTING
PLANT DESIGN • GEOLOGIC INVESTIGATION

FOR GREATER EFFICIENCY

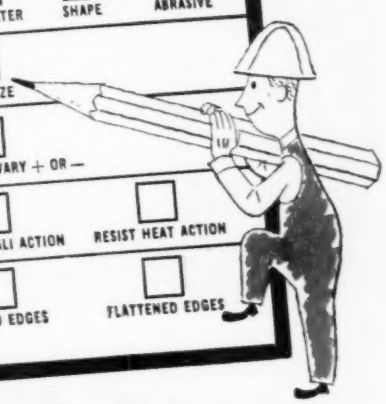
buy CF&I CAL-WIC INDUSTRIAL SCREENS

Let CF&I engineers help select the best CAL-WIC screen for your operation. CAL-WIC screens are woven to the most exacting specifications and are available in ferrous and non-ferrous metals to meet individual requirements.

SELECTING THE RIGHT SCREEN FOR EVERY PURPOSE . . . CHECK THE

(efficiency quotient)

TYPE OF EQUIPMENT . . .	☐ VIBRATING	☐ REVOLVING	☐ STATIONARY		
SCREEN WILL BE OPERATED . . .	☐ HORIZONTALLY	☐ VERTICALLY	☐ AT AN ANGLE		
MAJOR IMPORTANCE IS . . .	☐ ACCURATE GRADING	☐ TONNAGE	☐ LIFE OF SCREEN		
MATERIAL TO BE SCREENED . . .	☐ DRY	☐ DAMP	☐ WITH WATER	☐ SHAPE	☐ ABRASIVE
RATIO IN FEED TO THE SCREEN . . .	☐ OVERSIZE	☐ UNDERSIZE			
LIMITATIONS OF SIZE VARIATIONS . . .	☐ WIRE MAY VARY + OR —	☐ OPENING MAY VARY + OR —			
ANY SPECIAL REQUIREMENT . . .	☐ RESIST ACID ACTION	☐ RESIST ALKALI ACTION	☐ RESIST HEAT ACTION		
TYPE OF EDGE PREPARATION . . .	☐ HOOK STRIP	☐ WELDED EDGES	☐ FLATTENED EDGES		



THE COLORADO FUEL AND IRON CORPORATION—Denver
PACIFIC COAST DIVISION—Oakland
WICKWIRE SPENCER STEEL DIVISION—New York

CAL-WIC INDUSTRIAL SCREENS CF&I
THE COLORADO FUEL AND IRON CORPORATION

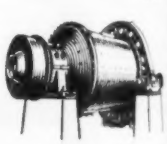
1907

Allis-Chalmers know-how and equipment have been playing a leading role in the processing of taconite. A-C research laboratory tests, along with pilot plant operations and field work, have revealed valuable data on the processing of low grade iron ore. Crushers, vibrating screens and grinding mills furnished by Allis-Chalmers are already helping to solve the problem of taconite processing on the Mesabi range.

This *unsurpassed* background and experience on taconite, as well as A-C's many years of successful accomplishments on other ores, is available to you when you call an Allis-Chalmers representative. Phone the A-C man nearest you today, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-2997

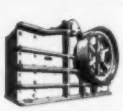
ALLIS-CHALMERS



Grinding Mills

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Vibrating Screens



Jaw Crushers

Gyratory Crushers

Hammermills

Kilns, Coolers, Dryers

Proof that mining men find it profitable to specify Allis-Chalmers grinding mills is seen in the fact that 7 *out of* 10 A-C mills sold today are repeat orders!

ACTUAL SIZE

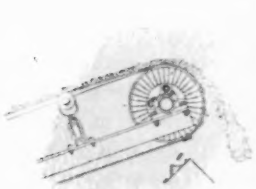
DUMB-BELL?...

... NO,

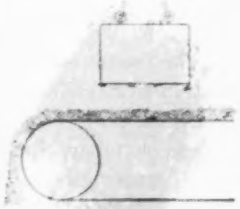
it's a big 8-inch hunk of iron that found its way into a crusher. Its scarred surface tells a sad story about that crusher and its unhappy owners who learned how economical an investment a magnet can be ... the hard way.

Preparation plants that don't magnetically protect their crushers, belts and other equipment ought to compare the cost of tramp iron trouble with that of adequate magnetic protection.

And if your old magnets aren't doing the job, learn about the new, improved types available. *Write Dings today for* CATALOG C-5000-B.



Dings Magnetic pulley installed as head drive pulley on conveyor belt. Iron separated, discharged automatically.



Dings Rectangular Suspended Magnets pull iron out of deepest burdens, fastest moving conveyor belts.

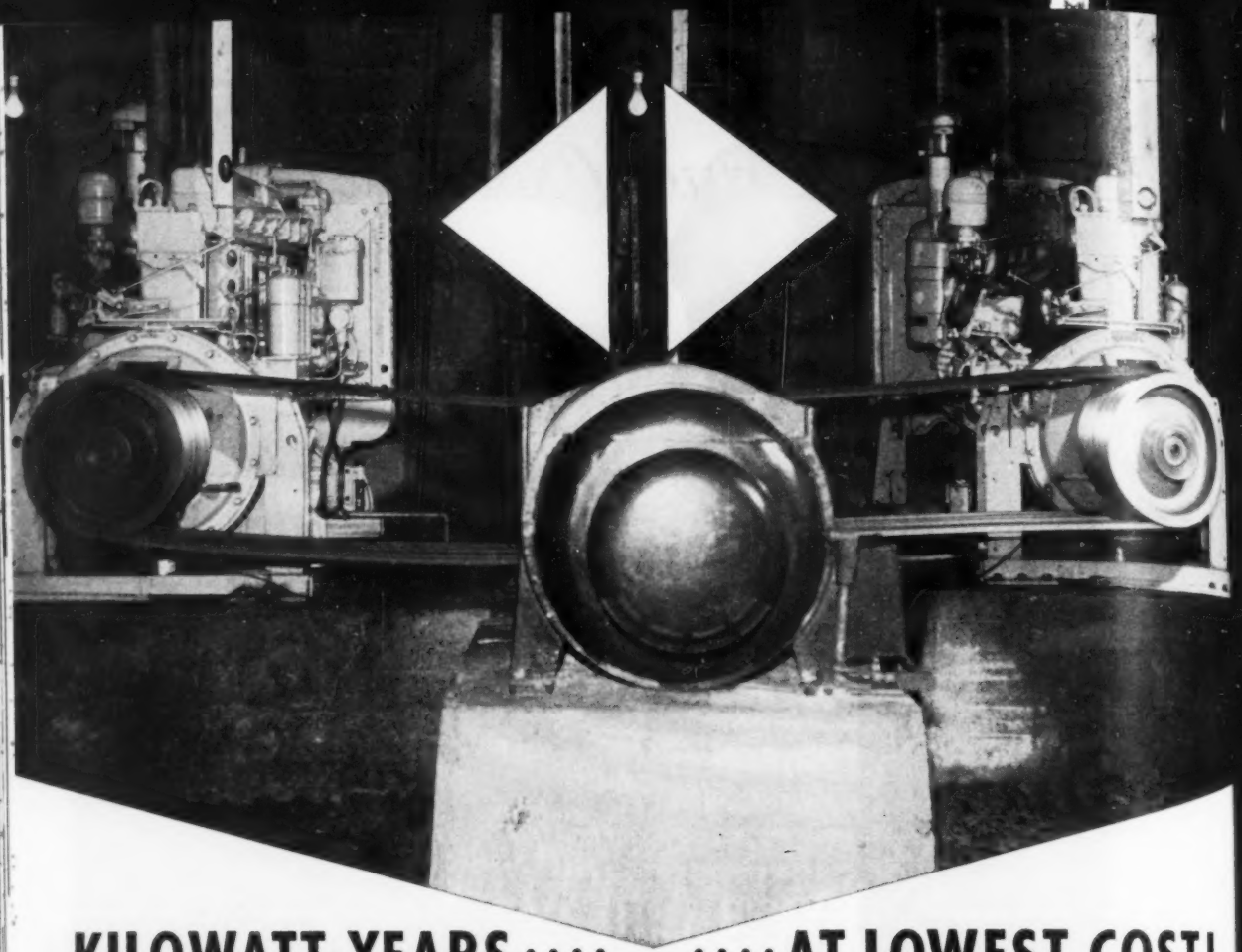
RS153

Dings

MAGNETIC SEPARATOR COMPANY

4719 W. Electric Ave., Milwaukee 46, Wisconsin

Magnetic Separation Leader for over Fifty Years



KILOWATT-YEARS · · · · · · · · AT LOWEST COST!

Non-stop around the clock and calendar, these two Caterpillar D13000 Diesel Engines supply vital electric power in a remote corner of Quebec. V-belted to a General Electric generator, they produce 175 KW at this Consolidated Candego Mines Ltd. installation 12 miles south of the village of Marsoui, County of Gaspé North, P. Q. These two Cat* Engines have passed the *11,000-hour mark without one cent for repairs!* A third D13000 is on standby duty.

The two main engines deliver full rated power on only six U. S. gallons of fuel per hour. Because of their Caterpillar-built fuel injection systems and precombustion chambers, Cat Diesels *will not foul* on low-cost No. 2 furnace oil! This means a *three-way saving:* less engine maintenance, cheaper fuel, and less of it.

Honestly rated Caterpillar Engines continue to give full power, year after year, because of unseen quality features: aluminum-alloy bearings and pistons, specially hardened crankshaft journals and cylinder liners, and precision Caterpillar workmanship.

Many mines find that it pays to standardize on rugged, economical Caterpillar power. They find an added payoff in skilled service—any time, anywhere—from well-stocked Caterpillar Dealers. Your own dealer will show you the most profitable engine or electric set for your needs—12 models up to 500 HP and 315 KW.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—R

WE'VE MADE CLAIMS···
NOW MAKE US
PROVE THEM

—Drifts and Crosscuts—

Report From Norway—Karel Wegkamp, MINING WORLD's traveling editor is now in Norway. He has completed his work in England, France and the Netherlands which was partially outlined in the July issue. He is now in Kirkenes, Norway, one of the world's most northern mining camps 360 kilometers north of the Arctic Circle.

Wegkamp's arrival in Norway.

Nowhere in the world is there a more timely mining and concentration story than at Kirkenes. There, on a commercial scale, in a new plant, Aktieselskabet Sydvaranger is producing a high grade iron concentrate from a low grade, hard, abrasive, iron formation. The ore, averaging about 33 percent total iron of which 30 percent is magnetite is similar in nearly every respect to the magnetic taconites of the eastern Mesabi Range.

Peak prewar production was 1,982,600 tons of ore which was ground to 39.8 percent minus-325-mesh in ball and tube mills, magnetically concentrated, and the concentrate briquetted.

When the Nazi Germany army retreated from Norway it destroyed the entire plant including the seven acre mill building.

Accordingly it was logical for MINING WORLD to send an Editor to do a complete on-the-spot report on the Sydvaranger operation; and Karel Wegkamp was the logical choice for the assignment. For the past four years his major interest has been iron ores. He has seen most of the open pit and underground iron mines in Minnesota, Michigan, New York, Pennsylvania, New Jersey, Utah, California, and Nevada. He has written technical reports covering virtually every phase of iron ore production—mining, beneficiation, sintering. The October 1951, Iron Ore Outlook, issue of MINING WORLD was projected and carried through under his direction.

The October 1953 issue of MINING WORLD will tell the full story of the new Sydvaranger taconite operation. It will tell of the men, the methods, and machinery which now make this operation a greater success than before destruction—by rebuilding, installation of new equipment, and adoption of latest methods.

U. S. Bureau of Mines Director—The withdrawal of the nomination of Tom Lyons for Director of the U. S. Bureau of Mines after a stormy session of the Senate Interior Committee leaves an important post to be filled. Mr. Lyons' stand before the Committee was admirable. Certainly the Administration has advocated return of many rights and duties to the State governments. Congress should determine whether the existing Federal Coal Mine Inspection Laws should be changed. Every Director should, of course, do his best to carry out laws of Congress and Lyons unquestionably would have.

The mining industry needs a mining man to head the Bureau. It has a job to do to find such a man within its own ranks. Fortunately, Under Secretary of the Interior Felix E. Wormser knows the industry and will work with it wholeheartedly. Now is the time to forget politics. One of the most competent men, who has both mining and governmental experience, mentioned previously for the post was immediately condemned by some industry leaders because of his political party membership.

One difficulty in securing a Director has been the belief that, financially, qualified operators can't afford it. However, it's time for the industry and key personnel to realize that "it can't afford not to have the proper man as Director."

This man should be an experienced western mine executive who has had both metal and coal mining operational experience. Washington experience in advising the government on its minerals program and in testifying before Congressional committees would be a valuable asset.

The mining industry, its local and state associations, and every individual connected with mining has a right and duty to see that the new director is the man for the job. Inform your association and Under Secretary Wormser of the best qualified man for this important position.

Metal markets—Import of monazite concentrate from South Africa is expected shortly. . . . Large scale production is planned by the Monazite and Mineral Ventures Ltd. at its Steenkampskraal mine in Cape Province. . . . Contracts for three year's production have been made.

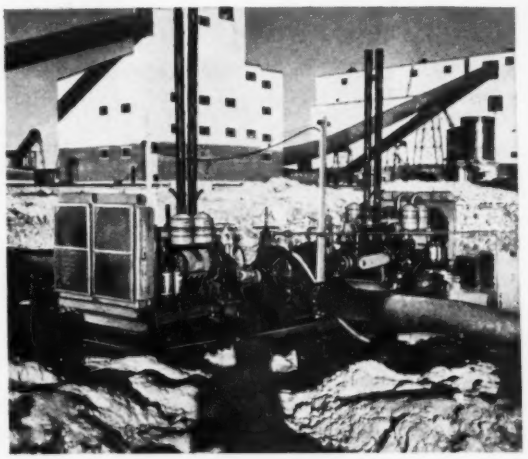
Treatment Trends—Additional data have now been released concerning the metallurgical processes used for recovering byproduct uranium and pyrite from South African gold ores. . . . The declassified over-all process was first reported in the December 1952 issue of MINING WORLD. . . . Flotation plays an important part. . . . In the Main Reef Leader plant of Daggafontein Mines Ltd. cyanide plant slime together with reclaimed slime from old tailing are treated in Agitair flotation cells to produce a uranium-pyrite concentrate with small gold content. . . . This concentrate is then comingled and treated with Kimberley Reef uraniferous material for uranium recovery. . . . The second flotation step is to recover auriferous pyrite by Wemco cells after uranium extraction. . . . All soluble salts are washed free before uranium is dissolved in acidic solution. . . . Manganese dioxide used as an oxidizing agent remains in solution after uranium is precipitated and is recovered for reuse. . . . Slacked lime is added to solution to a pH of 6.0 to precipitate iron and alumina which are filtered off. . . . Filtrate is then brought to a pH of 9.0 to precipitate manganese dioxide for reuse. . . . Lepanto Consolidated Mining Company premier Asiatic copper producer is now using selective flotation. . . . Increasing amounts of pyritic minerals in the enargite ore (Cu_3AsS_4) were floating in bulk concentrate. . . . Grade was lowered below 20.00 percent and tonnage increased. . . . High transportation and treatment costs periled operation. . . . New method increases grade by 8.6 percent while dropping tonnage by 4.9. . . .Decline in copper and gold recovery now more than offset by marketing savings.

GM DIESEL
CASE HISTORY No. 524-1

USER: Barvue Mines, Ltd., Barraute, Quebec. Hydraulic Superintendent, Bert Thomas.

INSTALLATION: Six GM Series 71 Diesel Twins; two drive 2-stage centrifugal pump supplying three 2-inch monitors which jet the water at 125 psi; two on 12-inch pump pumping water from La Flamme River, and two on 12-inch removal pump which sends slurry (25 to 35% solids) to tailing pit.

PERFORMANCE: Company is hydraulic-stripping about 1,000,000 yards of clay overburden for about 35¢ a yard. Barvue Mines estimated $1.25 a yard to strip by ordinary methods.



SAVED:

$.90 PER YARD ON ONE-MILLION-YARD STRIPPING JOB

Here's a unique application that *proves the profit* of General Motors Diesel power.

Superintendent Thomas reports that the six GM Diesel Twins powering the pumps in this hydraulic stripping operation are on the job 24 hours a day, 7 days a week, except for a 2-hour stop on Saturdays to change oil and filters.

Because of their 2-cycle operation (power at *every* piston downstroke) GM Diesels deliver the steady, uniform power required to keep a steady pressure at the monitors. They burn a minimum of low-cost Diesel fuel. Compactness and light weight make them easy to move. And in remote locations like this, standardization of design means a lot, because a small stock of low-cost parts protects all twelve engines. For dependable Diesel power *at the lowest cost per horsepower hour*, see your GM Diesel distributor today.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS, DETROIT 28, MICHIGAN
Single Engines 16 to 275 H.P. Multiple Units Up to 840 H.P.

It pays to STANDARDIZE on

GM
GENERAL MOTORS
DIESEL POWER

NEW

ROTARY BLAST HOLE DRILL

The BUCYRUS ERIE 50-R

Increases Drilling Speed

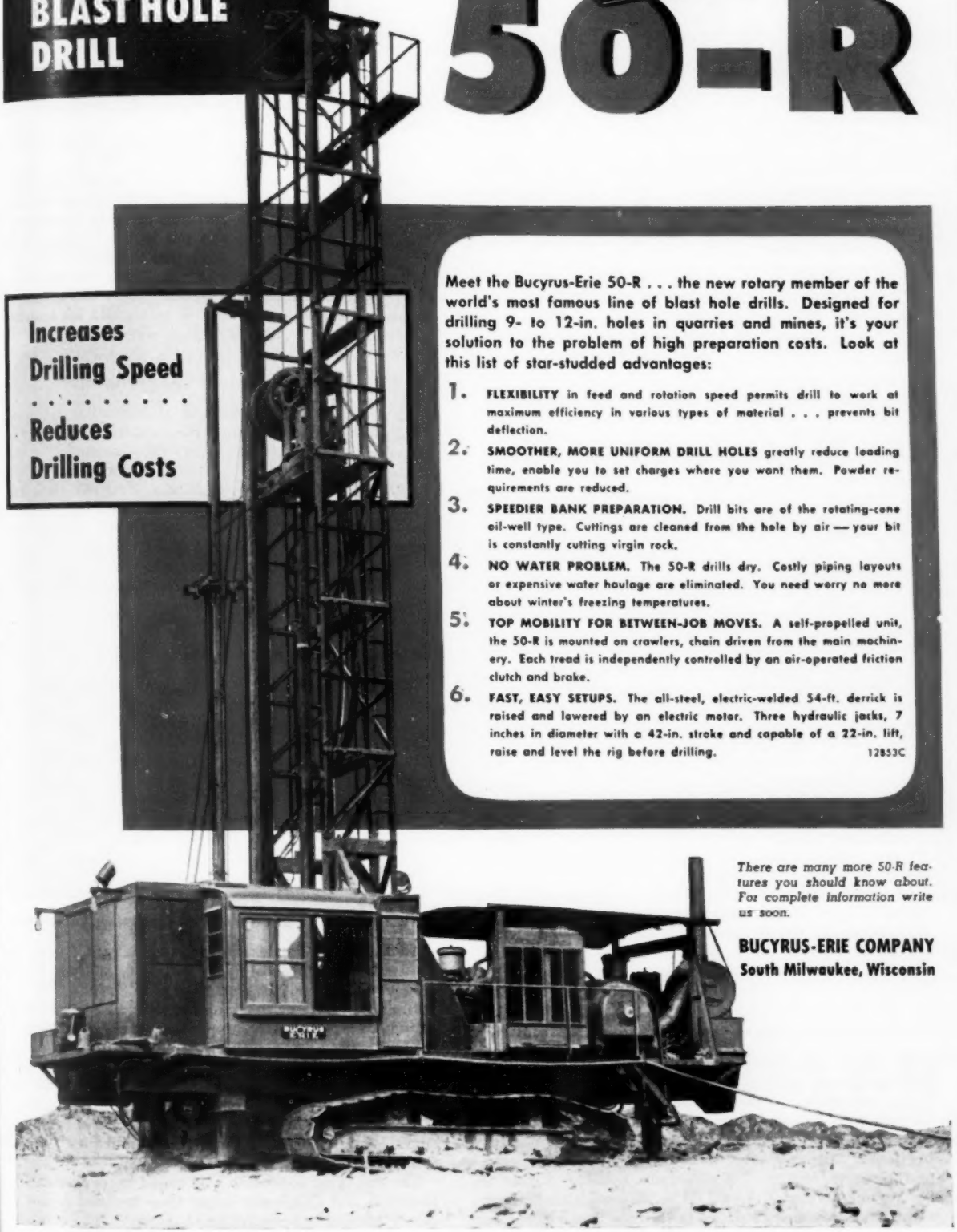
. . . . . .

Reduces Drilling Costs

Meet the Bucyrus-Erie 50-R . . . the new rotary member of the world's most famous line of blast hole drills. Designed for drilling 9- to 12-in. holes in quarries and mines, it's your solution to the problem of high preparation costs. Look at this list of star-studded advantages:

1. **FLEXIBILITY** in feed and rotation speed permits drill to work at maximum efficiency in various types of material . . . prevents bit deflection.
2. **SMOOTHER, MORE UNIFORM DRILL HOLES** greatly reduce loading time, enable you to set charges where you want them. Powder requirements are reduced.
3. **SPEEDIER BANK PREPARATION.** Drill bits are of the rotating-cone oil-well type. Cuttings are cleaned from the hole by air — your bit is constantly cutting virgin rock.
4. **NO WATER PROBLEM.** The 50-R drills dry. Costly piping layouts or expensive water haulage are eliminated. You need worry no more about winter's freezing temperatures.
5. **TOP MOBILITY FOR BETWEEN-JOB MOVES.** A self-propelled unit, the 50-R is mounted on crawlers, chain driven from the main machinery. Each tread is independently controlled by an air-operated friction clutch and brake.
6. **FAST, EASY SETUPS.** The all-steel, electric-welded 54-ft. derrick is raised and lowered by an electric motor. Three hydraulic jacks, 7 inches in diameter with a 42-in. stroke and capable of a 22-in. lift, raise and level the rig before drilling.

12853C



There are many more 50-R features you should know about. For complete information write us soon.

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CAPITOL CONCENTRATES

ORGANIZATIONAL MISTAKES PROVIDE OBJECT LESSONS

In spite of the glowing statement issued by Russell Forbes, acting administrator of the Defense Materials Procurement Agency, the majority of the agency's achievements are in the foreign field and in aid to but a handful of domestic mining companies as far as loans and floor-price contracts are concerned. The general purchase programs bulk large dollar-wise and a great many small mining outfits have been helped thereby, but these programs were more or less automatic and it was not necessary for operators to make individual applications for aid.

Early in World War II it was discovered that the RFC Mine Loan Division took a leisurely average of one year to process an application. Largely due to pressure from the Congress and interagency action by former Senator Charles B. Henderson, then chairman of the board of RFC, this period was reduced to an average of one month—which shows what can be done if the will is there to do it. It is doubtful if DMPA ever managed to better the average of RFC's original one year per domestic application, even when the need was supposed to be urgent. When the domestic lead and zinc programs were dropped last year, the DMPA files were loaded with partly completed contracts which were lost purely through inefficiency, red tape, vacillating policy and dilatory tactics.

To give the devil his due, it must be said that part of DMPA's trouble has been that its funds were controlled by the RFC (which has looked at mining with a jaundiced eye for the past several years) and DPA (which seldom knew what it was doing). Also, DPA and the Munitions Board controlled DMPA policy nearly 100 per cent and could pull the rug out from under many of its contract programs almost without notice, and frequently did.

DMPA took over all the mistakes of organization and policy of DMA and Administrator Jess Larson never saw fit to rectify the difficulties as he could have done at the beginning when his directive was first issued. Neither Howard I. Young nor Tom Lyon was permitted to do anything about reorganization of the agency though they would have loved to do so. The net result was a staff of good men who were thoroughly frustrated in their attempts to do something substantial for domestic mining. All the factors which contribute to DMPA's failure as an emergency agency may never be known, but the record should serve as an object lesson for the future.

• *Conference Report Stressed Mining's Eligibility*

All of the small business agencies heretofore set up by Congress to aid small business have been authorized under acts which were specifically arranged for manufacturing concerns. The Smaller War Plants Corporation, organized in the early 1940's, did make some mining loans, but only after Senator Murray of Montana and Senator Milliken of Colorado insisted during a Senate debate that it should do so. At that it took about eight months of insistence by the Senate Small Business Committee to get the corporation to organize a mining division. When the successor agency, the Small Defense Plants Administration, was authorized, committee chairmen, though informed of the former troubles, refused to specify mining in the act and the agency never extended any aid to mining.

Now we are to replace the SDPA with a Small Business Administration. Through the efforts of Senator Barry Goldwater of Arizona in the Senate and Representative Gracie Pfost of Idaho in the House to amend the Capehart and Thye-Hill bills so as to mention mining, a strong statement was put in the Conference Report on S. 1030 (which authorizes the SBA). The statement says, among other things, "It is the unanimous opinion of the conferees that a producer of strategic and critical minerals and metals is as eligible for assistance under Title II as any other business concern . . ."

• *Change In Assessment Year Proposed*

Representative Gracie Pfost of Idaho has introduced H. R. 5704, a bill to change the date from July 1 to October 1 for the beginning of annual assessment work on mining claims held by location in the United States, including the Territory of Alaska. The bill also would extend to October 1, 1953, the time during which the annual assessment work on such claims may be made for the current year beginning July 1, 1952. A similar bill passed the Senate during the 82nd Congress, but was blocked in the House Interior and Insular Affairs Committee by Regan of Texas.

• *Another Exception Is Made*

The latest exception to ODM Director Arthur S Flemming's freeze on governmental purchases of "new" copper is a loan of $22.4 million by the Export-Import Bank to the Rhodesia Congo Border Power Corporation, Ltd., of Northern Rhodesia. The money will be used to expand power facilities for four mining companies and will be repaid to the U. S. in copper. Dollar income from the copper will enable the company to pay off its debt without dipping into the sterling area's limited supply of dollars, stated the bank. Well—one excuse is as good as another.

• *House Votes Extension of Tungsten Program*

H. R. 2824 by Representative Aspinall of Colorado was passed by the House of Representatives on June 15. This bill would extend for two years—to July 1, 1958—the termination date of the tungsten purchase program initiated under authority of the Defense Production Act of 1950.

The bill would dispel any secrecy surrounding details of the government's tungsten stockpile, domestic production, or other data that has been classified as secret. It would require publication of purchase data three times annually, to enable miners to plan their development and production operations.

The two-year extension was urged by producers from Montana and California when they testified before the House mining subcommittee.

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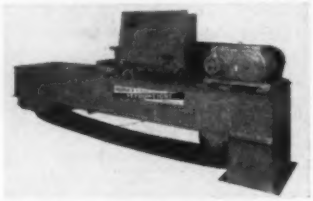

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• *Flemming's Appointment to ODM Confirmed*

One of the few top executives to be reappointed by the present Administration is Arthur S. Flemming to be director of the Office of Defense Mobilization. Flemming previously was head of the Defense Production Administration, an agency which controlled the policies and defense funds of the Defense Materials Procurement Agency. Officials of DMPA complained bitterly that lack of knowledge of the mining business in the top levels of DPA was largely responsible for the failure of DMPA to function properly. Flemming, up to the time of his confirmation by the Senate to his present job, has been acting director of ODM and so far is appears as though there still is no one in his organization who knows what the score is.

• *Tariff Bill Bottled Up In Committee*

The uproar about the Simpson bill to extend the Trade Treaties Act and at the same time place a sliding scale tariff on lead and zinc caused the House Ways and Means Committee to split the measure into two bills, one of which extended the Trade Treaties Act and the second which contains the sliding scale tariff provisions and other features disapproved by the Administration. There was no difficulty in passing the Trade Treaties-extension, but the second Simpson bill appears to be permanently bottled up in the Ways and Means Committee despite considerable pressure to bring it to the Floor of the House for a record vote.

• *Committee Acts On Regan Bill*

The words "pumice" and "pumicite" were deleted and the word "common" inserted before "stone" during committee consideration of H. R. 334, the Regan bill relating to acquisition of deposits of sand, stone, gravel, pumice, etc., under the mining laws. With these amendments the House Interior and Insular Affairs Committee reported the bill favorably.

As amended, the bill would remove sand, common stone, gravel, and cinders on public lands from acquisition under the mining laws and provide for their disposition under the Materials Disposal Act of 1947.

• *What Next?*

Representative Clifford Hope of Kansas has offered a new bill (H. R. 5358) entitled, "To protect the surface values of lands within the national forest." The bill provides that when a mining claim, located within a national forest, is patented, the patentee will acquire no title to the timber thereon unless he buys it from the U.S. at the time of patenting or within three years thereafter. How do you like that?

COMING CONVENTIONS

August 31, September 1 and 2, 1953. MINERALS BENEFICIATION SUBSECTION, AIME, Mesabi Range meeting. Hibbing, Minnesota.

August 31, September 1. Third Biennial Briquetting Conference. Banff Springs Hotel, Banff, Alberta, Canada.

September 21 to 24, 1953. WESTERN DIVISION AMC MEETING, Olympic Hotel, Seattle, Washington.

October 15 to 17, 1953. NATIONAL CLAY MINERALS CONFERENCE, sponsored by the National Research Council. University of Missouri, Columbia, Missouri.

October 28 through 31. INTERNATIONAL MINING DAYS sponsored by the New Mexico Mining Association and the Mining Committee of the El Paso, Texas Chamber of Commerce, El Paso, Texas.

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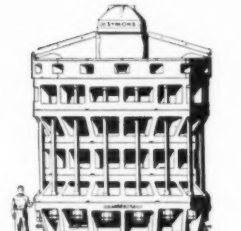

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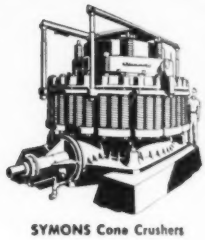
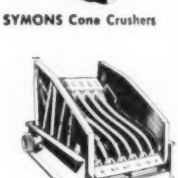


SYMONS Cone Crushers



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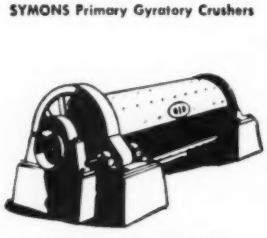

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INTERNATIONAL PANORAMA

GRAND JUNCTION, COLORADO—Uranium production in the United States has increased rapidly in 1953 over the 1952 output. In Colorado, Utah, and Arizona first quarter 1953 production was almost double that for the same 1952 period.

TORONTO—The Geological Survey of Canada has 77 field parties investigating mineral deposits in all parts of the Dominion. The Yukon and British Columbia have the most parties at work.

DJEBEL MEDJOUF, ALGERIA—A deposit of high grade iron ore has been discovered by Mining Exploration Office geologists. Open pit mining appears feasible, but local water supply is inadequate.

SALISBURY, SOUTHERN RHODESIA—The old Baddeley copper mine is being reopened after a 13 year shutdown. The Dora and Makooi prospects are also being investigated.

CLIMAX, COLORADO—Climax Molybdenum Company has increased mining and molybdenum mine to 23,000 daily tons. By year's end production rate is scheduled to be 28,000 to make mine the world's second largest underground mine.

OSLO—Norsk Berverk A/S has started pilot plant recovery of columbium ore from the Cappelen pegmatite deposits. Initially 40,000 tons of ore will be mined annually.

MOUNTAIN IRON, MINNESOTA—The first shipment of taconite concentrate has been made from the experimental Pilotac plant of the Oliver Iron Mining Division of the United States Steel Corporation. Projected annual plant capacity is 500,000 tons of concentrate.

WASHINGTON, D. C.—The General Services Administration has purchased, for government account, 21,298 pounds of beryl at Franklin, New Hampshire, and 7,896 at Custer, South Dakota.

CHOATE, BRITISH COLUMBIA—Western Nickel Company, a subsidiary of Newmont Mining Corporation and Pacific Nickel Mines, Ltd. has signed a delivery contract with the DMPA for 36,000,000 pounds of nickel. Development and preparation of Pacific Nickel's mine in the Yale district will precede initial shipment scheduled for March 1, 1955.

LA PAZ, BOLIVIA—The government owned, Bolivian Mining Corporation and the Bolivian government have arranged for sliding scale compensation payments for nationalization of the tin mines of the Patino Mines and Enterprises Consolidated, Inc. Payments will vary from 1.0 to 5.0 percent and above from a base tin price of 80.00 cents per pound.

STORM LAKE, MONTANA—The Sunshine Mining Company has leased eight tungsten claims from the Mines Prospecting and Exploration Company. Exploration is planned by Sunshine, the nation's largest silver producer.

ARTHUR, UTAH—The Kennecott Copper Corporation is increasing production of byproduct molybdenum from its copper ores by eight percent by installation of new flotation machines in its Arthur and Magma mills.

TUSCON, ARIZONA—The Copper Creek Consolidated Mining Company has signed a contract with the DMPA for underground leaching of copper. A total of 5,500,000 pounds of copper from the process will be purchased by DMPA at a 29 cents per pound price.

CANBERRA, AUSTRALIA—The Australian Government will extend until 1960 its income tax concessions on mining profits and dividends. An additional 13 metals and minerals will be granted concessions.

YELLOWKNIFE, NORTHWEST TERRITORIES—The Consolidated Mining and Smelting Company has poured the 1,000th gold brick at its Con mine. The first was poured 15 years ago. In 1952 the Con produced 128,824 tons of 0.57 ounce ore.

TOKYO—Tokyo Boeki Shokai, a Japanese trading company, has concluded an agreement with the Queen of Bronze Mining Company in Oregon for between 19,000 tons and 28,000 tons (copper content) of copper concentrate over a year to supply Japanese smelters. First shipment of about 1,000 tons is expected by September.

CAPETOWN, SOUTH AFRICA—Official dedication of South Africa's third uranium recovery plant was at the Blyvooruitzicht Gold Mining Company Ltd.'s operation in the Western Rand. Though just officially opened it has been in operation since April.

IVANHOE, VIRGINIA—New Jersey Zinc Company has completed its stage in its development of a new zinc mine here. The shaft has been sunk 1,050 feet, and excavation of underground stations is the next step.

SINGAPORE—Falling rubber and tin prices have prompted Malayan trade unions to ask for nationalization of the industries because of "instability."

DEMING, NEW MEXICO—Haile Mines, Inc. is building a 300 ton per day HMS and jig plant to upgrade 18 percent manganese ore for sale to government stockpile here. Plant operation is scheduled for October.

LONDON—For the first time since 1947, the trade delegation from the Soviet Union is offering platinium on the London market. A minimum of 3,000 ounces at the current free market price of $90 a troy ounce has been made available.

HAMILTON, NEVADA—Newmont Exploration Ltd., a subsidiary of Newmont Mining Corporation, has a major lead development project underway near Hamilton in White Pine County.

SAGUACHE COUNTY, COLORADO—Bear Creek Mining Company, exploration subsidiary of Kennecott Copper Corporation, has started a diamond core drilling exploration program in the Bonanza district of Saguache County in a search for lead-zinc mineralization.

OSLO—The Norwegian government plans to spend an additional £100,000 this year for continuance of test drilling of northern Norway's Dunderland iron ore deposits.

Queen of Bronze, Japan Make Copper Agreement

Queen of Bronze Mining and Smelting Company of Grants Pass, Oregon has agreed to export between 19,000 and 28,000 tons (copper content) of copper concentrate over a year's time to the Tokyo Boeki Shokai, a Japanese trading company, for use in Japanese smelters.

The initial shipment, which is expected to reach Japan by September, will be about 1,000 tons. The Queen of Bronze mine in Josephine county, Oregon, is said to have a stock of about 4,000 tons of copper concentrate. The mine had been closed since the end of the war.

The copper will be divided among six leading Japanese copper smelters and will be used to reduce smelting costs and also to meet the shortage of scrap copper.

Copper Creek to Use New Methods in DMPA Contract

Copper Creek Consolidated Mining Company, Tucson, Arizona, has been awarded a copper-production contract by the Defense Materials Procurement Agency. The contract calls for 5,500,000 pounds of copper which the government agrees to purchase at 29 cents a pound f.o.b. Midwest points. Copper Creek, in turn, will spend about $150,000 preparing its ore body and building a precipitation plant. It expects to start production of copper precipitates within six to eight months and to fulfill its contract by June 30, 1956, expiration date for the guaranteed price.

Copper Creek plans to cave the ore and recover the copper underground by a leaching process with water and sulphuric acid. This procedure will eliminate bringing the ore to the surface for treatment, and will be one of the first uses of such a method underground.

The company's mine, known as the Old Reliable, is located in the Copper Creek area of the Bunker Hill mining district, Pinal County, Arizona. Access to the property is from Mammoth northeasterly by 11 miles of unimproved road. The mine has been opened on the 100- and 200-foot levels and access to each is by tunnel. A vertical raise extends from the 100-foot level to the surface and three vertical raises connect the 100- and 200-foot levels. Horizontal development on the 100 level consists of parallel chute drifts, most on 20-foot centers at right angles to the direction of the tunnel, and a pheripheral drift. The 200-foot level has not been as extensively developed or stoped as the 100-foot level. The average grade of ore, as indicated by the bureau's sampling, was 2.25 percent copper. Total measured and inferred ore reserves were estimated at 453,000 tons.

Controlling interest in the company is said to be held by Lewis W. Douglas and associates. Morris J. Elsing of Tucson is the company's manager.

EUREKA!

The Eureka Corporation, Ltd. is using this Joy 300 oil well drill in exploring the Ruby Hill mining properties near Eureka, Nevada. Attempts at coring a deep (2,350 feet) mineralized zone met in small-core diamond drilling were unsuccessful. And underground workings met quantities of water too large to be handled by existing pumping facilities. Eureka's general manager, George W. Mitchell, then brought in oil well drills that would take a large diameter core in the hope that high core recoveries could be achieved. This work has been successful, with core recovery now averaging 95 percent in a thick (15 to 40 feet) orebody assaying $75.00 per ton.

Eureka Corporation found it—a way to adapt oil well methods to mine exploration

Exploration and development at the Eureka Corporation, Ltd.'s Ruby Hill properties near Eureka, Nevada have been plagued by a seemingly endless chain of problems since the company first leased the properties in 1937 from the Richmond-Eureka Mining Company, a subsidiary of the United States Smelting Refining and Mining Company.

The very profitable early operations at the mine had been terminated when the deposit being worked was cut off by a fault, the Ruby Hill, and no continuation could be found on the opposite side. Original interpretations led to the conclusion that the section of the deposit already mined in the footwall block was the down-dropped portion and that the Ruby Hill was a reverse fault. In other words, the hanging wall block had obviously been eroded away and the mined-out area represented the total remaining deposit.

New Interpretations

Eureka's program under the direction of George W. Mitchell, general manager, and Vernon A. Manz, assistant general manager, was based on a later interpretation which indicated that the Ruby Hill was not a reverse but a gravity fault and that there remained at greater depth the remaining section of the orebody. If, as the fault intersection indicated, the undiscovered portion of the deposit were similar in tenor and extent to the mined-out area, the expense of reasonable exploration at depth would be justified.

As expected from this later interpretation, ore was met at depth (about 2,300 feet) indicating a vertical separation of about 1,000 feet in relation to the lowest previous workings on the 1,300 level. Conclusive evidence was lacking, however, since extensive diamond core drilling failed to recover core from the deposit that appeared from sludge assays to contain high values in lead, zinc, gold, and silver.

The friable ore defied every effort made to recover core and it was necessary to base the mineral value of the intersection on sludge samples taken from deep holes, with the attendant risk of salting the samples. When coring failed, shaft-sinking and crosscutting were tried in a second attempt to open the deposit to determine its tenor, extent, and attitude. This plan, too, was blocked when workings penetrated a fault carrying amounts of water greater than existing power facilities were equipped to handle. Since power must be generated at the mine—no outside source is available in the Eureka area—and because ore was only indicated and not proved by coring or development, the costly installation and operation of a generating plant at the mine large enough to handle expected underground pumping requirements was considered an unwarranted investment at the time.

Drilling mud—a mixture of water, Aquagel, and other agents—is circulated in the hole to remove cuttings, lubricate and cool the bit, and compact the walls to prevent caving. These two butane-powered, reciprocating-piston pumps handle the mud requirements of the Joy 300. The smaller unit on the left is a Gardner-Denver powered by a Continental engine. The other is an Ideal driven by a Waukesha engine.

The Choices

Two basic alternatives existed. One involved obtaining cheap power to operate dewatering pumps. The second required devising a system of exploration that would circumvent the problems of coring and water inflow and still give definite results on which to base future plans and investments.

Four possible sources of inexpensive power were considered. Application for power from Hoover Dam was rejected, since existing demands exhausted available supply. Proposed government installation near Eureka of an experimental power plant driven by atomic energy met seemingly endless delays and carried no guarantee of an early decision. The other two possible sources were (1) a transmission line tapping proposed Idaho hydroelectric installations, and (2) construction of a steam plant near a mainline railroad in order to secure cheap fuel transportation and a transmission line to Eureka. Both of these proposals required large investments that could be safely made only if justified by proven ore reserves. Since proving ore reserves was the whole point in obtaining power, even these proposals were precluded.

And so, excluding abandonment of the property as a possibility, a method new to mining exploration that could prove the extent of mineralization was the remaining solution to Eureka's problems.

General manager Mitchell proposed using rotary drills of the type common in oil well drilling. It was his opinion that coring failure in the previous work was largely due to the small diameter of the core barrels, and that a larger diameter would have less tendency to break up the friable ore. Rotary drill holes would, of course, be collared at the surface. Diamond drilling had started from the 900 level of the mine and thus had bypassed much of the water-caverned dolomite near the surface.

Rotary Drilling Tried

To test the feasibility of rotary drilling and to get through the vuggy ground above the water table as inexpensively as possible, 10 holes were drilled by a small portable rig with a capacity of about 1,000 feet. These holes are now being deepened by two larger rigs

Eureka sank the new four-compartment Fad shaft in an attempt to open what appeared to be, from diamond drill sludge samples (the friable formation resisted coring), the lost portion of the Richmond-Eureka formation that once was a steady producer. The formation was cut by the Ruby Hill fault (its surface expression follows roughly the line of old dumps on the hillside in the left background) and the extension was not located until Eureka's recent diamond and rotary drilling work.

LEFT: Sampler Gus Gensoli and driller W. L. Crosson are shown with the core barrel and the business end of the tool string during coring—a 6½-inch Christensen Diamond Products Company diamond core bit. RIGHT: The crew shown here works the Joy 300 rotary rig. From left to right are Ken Meaker, derrickman; Gensoli; Fred Minoletti, floorman; and Crosson. As are many of the men working Eureka's two rotary rigs, Crosson is an experienced oil field driller.

George W. Mitchell is the vice president and general manager of the Eureka Corporation. The company's operations, near Eureka, Nevada, are presently confined largely to rotary drilling but plans call for extensive underground development to open the newly discovered extension of the Richmond-Eureka orebody.

owned by Eureka Corporation. Successful experiments with various coring methods in ore have resulted in consistent recoveries above 95 percent. To achieve this figure, a 6½-inch (outside diameter, taking 3½-inch cores) Christensen Diamond Products diamond core bit is used with a 13-foot Christensen full-floating core barrel. However, to again insure high recovery, only three to four feet of core is taken at one time.

Two coring methods that have been tried, but proved unsuccessful, were wire line and rotary coring. Wire line work (where a small inner core barrel is lowered through the hollow center of the string of tools and clamped to the bottom section) has the advantage of speed—the tools need not be removed from the hole when the core is pulled—but limits the diameter of core recovered. Rotary coring bits showed a definite tendency to break up friable or fractured material.

The smaller of the two rotary rigs now used is a Joy 300 oil well drill carrying a 58-foot mast and mounted on a semi-trailer. Using 3-inch drill pipe, this machine has a capacity of something over 2,000 feet. It is now being used to explore Eureka properties about two miles from Ruby Hill in the hanging wall block of the Ruby Hill fault where depths greater than 2,000 feet will not be necessary. Mineralization in this area is considered to have little or no relationship to the Richmond-Eureka deposits.

The second rotary drill, used for the deep holes at the Richmond-Eureka, is a Franks No. 137 with a tool string capacity of 150,000 pounds or, with 3-inch drill rods, about 5,000 feet.

Circulation Losses

The stratigraphic column through which the holes pass includes a thick formation of dolomite near the surface that causes constant trouble in lost circulation. As in drilling oil wells, Eureka uses a circulating load of drilling mud to remove cuttings, to lubricate the rods and bit, and to form a firm, compacted "wall cake" that prevents caving (the action of the expandable Aqualgel mud when forced into the cracks and fissures of the drilled formation tends to effectively harden the walls.) If circulation is lost, the hole can be advanced only by drilling dry ("dry" here means with water only to cool and lubricate the bit) at much reduced speeds. To regain circulation, the hole is cemented to a point above the occurrence of the crevice, or vug, and redrilled. At Eureka, this has too often been easier said than done. Many of the cavities met above the water table have been so large that cementing becomes a tedious and time-consuming operation. The idea is to fill the hole with a mixture of cement and any cheap bulk material that is easily introduced into the hole. However, "cheap" is strictly a relative term. In one recent hole at Eureka, in addition to over $5,000 worth of regular lost circulation materials, large quantities of horse and cow manure, gravel, brickbats, hay, and finally, 15 bales of excelsior were needed to regain circulation at a single point above the water table.

In some holes that have penetrated this section of karst dolomite, whipstocking (deflection) has been used to reduce the expense of circulation losses. In other words, after the hole has penetrated the ore deposit and coring has been completed, the drill string is removed, a whipstock (a wedge-like device used to redirect the bit and thus form a second hole at an angle to the first) is placed just below the water table, and a new hole is drilled to the formation. Though whipstocking will give an angle of but a few degrees, the effect can be increased by subsequent whipstockings and, of course, by the depth of the holes below their point of divergence.

Coring Procedure

Holes are drilled to 9⅞ inches and reamed for 10-inch casing to 15½ inches for the first 300 to 400 feet. They are then continued at 9⅞ inches to between 1,000 and 1,500 feet, where the diameter is reduced to 8½ inches. They are bottomed at this size. When coring, a 6½-inch diamond coring bit is used to take 3½-inch core. After 30 feet of coring, the hole is reamed to 8½ inches and coring again proceeds. Reaming is advisable during coring to insure that the small

clearance between the hole walls and the outside of the core barrel will not cause binding.

The foreman in charge of Eureka's drilling is Frank Dyer, who has had over 25 years' experience in oil fields for Standard Oil Company of California and other oil well companies. The small Joy rig requires three men per shift—a driller, a derrick man, and a floor man. The bigger Franks drill uses an extra floor man. Costs per foot and production rates have varied considerably and the relatively small number of holes precludes accurate average figures. It can be noted, however, that rock bit costs (both Reed bits with two cones and two gage cutters, and Hughes tricone bits are used) have run about $1.00 per foot. Bit costs in coring have averaged about $2.00 per foot. Daily average advance is even more variable, but in shale, where drilling is not necessarily faster per drilling hour but where fewer shutdowns and interruptions are encountered, 250 feet per day (three shifts) is not unusual. To check the formation being drilled, samples of cuttings are taken every five feet and panned immediately for sulphides. They are then washed, dried, and stored in cartons for a permanent logging record.

Hole Surveys

In holes as deep as these drilled at Eureka, direction of drilling is seldom, if ever, truly vertical. To insure accuracy of the ore estimates based on drilling, the holes are periodically surveyed. An Eastman single-shot instrument leased from the Houston Oil Fields Materials Company is used on the sand reel for taking readings when the drilling tools are out of the hole during bit changes, coring, etc.

At the risk of understatement, it can be said that results from drill holes that have been completed are encouraging. Mineralization was encountered at a depth of 2,350 feet and continued with no attenuation in grade to roughly 2,400 feet. Assays from core samples indicate a consistent tenor of about $75.00 per ton in lead, zinc, gold, and silver at present metal prices. These assays, incidentally, agree remarkably well with the assays made on the sludge samples from the original diamond drill holes. The deposit is nearly flat-lying and varies in thickness from 15 to 40 feet. Since exploration has not been completed, the lateral extent has not been determined. Further rotary drilling is planned that will result in a clearer picture of the size of the deposit.

When water was met during the sinking of the Fad shaft (the big four-compartment shaft mentioned above as the second attempt to explore the deposit), the practicability of grouting the ground between the shaft and the deposit was investigated by the Cementation Company Limited, an English firm. Final recommendations of this survey, together with plans formulated by Eureka, resulted in the present three-fold program for development of the deposit.

Future Development

First, the present rotary drilling program will be continued to determine more exactly the nature of the deposit, on which will be based the details of future work. Second, a source of inexpensive power will be developed to handle the pumping requirements. At present, it is estimated that for two years the pumps will handle 25,000 gallons of water per minute; the rate of pumping will be reduced to 11,000 gallons per minute at the end of this period and maintained at that rate for the life of the mine. (The transmission line from Idaho and the railhead steam plant are now considered the most likely sources of power.)

Third, when power is available to dewater the shaft, the bottom of the shaft will be grouted and a crosscut will be driven to the orebody. This crosscut, which will be the main haulageway, will also be grouted. By grouting the lower shaft and the lateral workings, water will bypass them and be collected in a sump formed at a lower level in the shaft, insuring a dry main haulageway.

Because the ore is soft and will undoubtedly not stand without elaborate support, some form of caving will be used when mining begins. If block caving were used, for example, no surface subsidence would be expected because of the depth of the deposit, the low ratio of ore thickness and the 40 percent increase volumewise of broken rock over material in place. In short, the volume of ore removed will be accounted for by the broken waste long before caving reaches the surface.

The drill platform on the Joy rig carries a Kelley drive and a Kelley bar attached to the top section of the tool string. As the bit advances the Kelley bar is lowered through the square hole in the drive wheel by a cable hoist.

When drilling through formations other than ore (or, perhaps more correctly, other than mineralized formations), drillers use a Hughes tricone or a Reed bit with two gage cutters and two cones.

The new surface plant at the Esmeralda mine near Parral, Chihuahua, Mexico was built by the Minas de Iguala, S. A., an Eagle-Picher Company subsidiary. Though located in one of oldest and most productive mining districts on the North American continent, the Esmeralda itself was not explored until early in the century. The 1,000-ton flotation mill is equipped to handle local custom ores, as well as ore from the Esmeralda. The dry tailing dump can be seen on the extreme left across the Parral road from the surface plant.

JUMBOS IN SHRINKAGE STOPES PAY OFF AT THE ESMERALDA

By R. L. Burns
Field Editor
MINING WORLD,
San Francisco, California

In the heart of one of North America's first mining districts at Parral, Chihuahua, Mexico—a district that has been continually active since 1547—an Eagle-Picher Company subsidiary, the Minas de Iguala, S.A., has mechanized the Esmeralda lead-zinc mine. Along with this mechanization, the company has evolved a new and unique method of shrinkage stoping that has vastly improved the ratio of tons per man shift, an important factor in lowering over-all mining costs.

Though the surrounding area was instrumental in providing the fabulous wealth of 16th and 17th century Spain, the Esmeralda vein itself was first explored early in this century by the Esmeralda Parral Mining Company. A three-compartment shaft was sunk in the footwall to 530 feet and development included crosscuts to the vein and drifts on four levels. Operations were suspended, however, in the early days of the revolution, ostensibly for lack of fuel required by the steam pumps.

Mill Follows Exploration

When Eagle-Picher began their examinations of the property in 1945, the mine was flooded, timbers above the water level were rotted, and the shaft collar was caved. Preliminary exploration, consisting of diamond drill holes sunk from the surface along the vein outcrop, proved the existence of a large mineralized area that warranted development. The mine was subsequently dewatered by a Peerless Deepwell pump driven by a Cummins Diesel engine, now replaced by underground pumps.

When underground exploration substantiated the drill reports, a surface plant was installed that could handle a production of 25,000 tons per month. During the exploration period, a Westinghouse 750-kilowatt generator driven by a General Motors Diesel furnished power until requirements were fulfilled by the local power company.

A single large vein containing mineralized lenses forms the Esmeralda deposit. The country rock is monzonite with a shale contact indicated on the north end of the vein 800 feet below the surface. Ore-bearing lenses are parallel to the attitude of the main structure—striking slightly east of north with a dip of 70° to the west—and vary considerably in size from a fraction of an inch in thickness and two or three feet in length to a thickness of four or five feet by 40 or 50 feet long. Except for the north end of the vein, where the upper levels show ore predominantly on the hanging wall and the

The first two sections of a three-section panoramic view of the Esmeralda mine and the city of Parral, Mexico are across the top of the pages above. The right-hand (third) section is on the second succeeding page. Cut out the three sections and assemble them end-to-end to form one picture. Seven photographs were used to make the panoramic montage. From the tailing pile at left to hills at far right, the camera was swung through an arc of 180°.

Vicente Cisneros is the general superintendent of the Esmeralda mine and mill.

The Esmeralda is serviced by a spur line from the Mexican National Railroad, leading from the center left to the lower right. The Parral river, seen here on the left and in front of the ridge to the right, at the time of *Mining World*'s visit, carried only the water discharged from the Esmeralda mine pumps. Though the stream is not intermittent (it supplies the water for Parral, a city of some 24,000 people), a severe drought in the Parral valley had reduced the river to a dry bed above the Esmeralda.

Overleaf for right section of picture ——→

lower levels show ore predominantly on the footwall, the lenses and shoots are scattered across the full width of the structure with little or no consistency. Even where no offsetting faults or dikes can be detected, changes in width are abrupt. The surface expression of the vein is strong—nearly 15 feet wide—over a distance of about 1,000 feet. To the south, the vein narrows to less than five feet. North of the strong outcrop the vein narrows, but remains strong for 800 feet to the Parral River, where it splits into small stringers.

Faults and fractures, large and small, are common in the structure and make the ground vuggy and difficult to drill. Though the formation is relatively soft, drilling has always posed a problem because holes tend to wander along fissures and struck steels are common.

Lead and zinc sulphides, carrying silver as a minor value, are the chief ore minerals. Gangue material is made up of quartz, fluorspar, and barite, none of which is recovered as a commercial product.

Though the deposit would lend itself well to shrinkage stoping, and though miners available in the district were experienced in this system, when active mining began, mill feed requirements dictated a system that required no underground storage. With shrinkage, mining would have to proceed at a rate three times the rate of mill consumption until an underground reserve was built up.

Goals For Better Mining

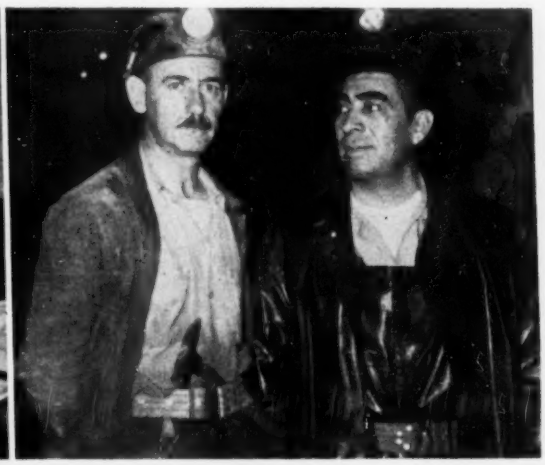
However, for the two reasons mentioned above, conventional shrink stopes using 3½-inch drifters mounted on column and bar were started to supply a limited amount of mill feed and experiments were begun to evolve a better mining method. Some of the goals set by J. W. Chandler, Eagle Picher's director of mines and technical adviser to Minas de Iguala, were:

1. Full-shift drilling.
2. High drilling speed.
3. Cheap, fast-drilling bit.
4. High drill-hole burdens.
5. Minimum underground storage.

The importance of this last goal was attenuated with time—the operating shrinkage stopes were building an underground reserve—and was finally discarded as the experiments continued.

Among the methods first considered were: A. underhand benching, B. blasthole drilling, C. sub-level

LEFT: C. Green is Esmeralda's surface superintendent and manages the completely equipped shops where much of the equipment used in mine and mill is fabricated and maintained. CENTER: C. E. Staalgaard is in charge of the general office. RIGHT: Henry Cirat, assistant mine superintendent, and Alberto Ceballos, mine foreman, have supervised the new mining methods evolved at the Esmeralda.



This converted Joy wagon drill carriage is used as a jumbo in the big shrink stopes of the Esmeralda. It carries two 14-foot chain feed sashes mounting heavy Ingersoll-Rand and Gardner-Denver drifters. The round is made up of a series of 10-foot holes drilled at a 60° angle in the back.

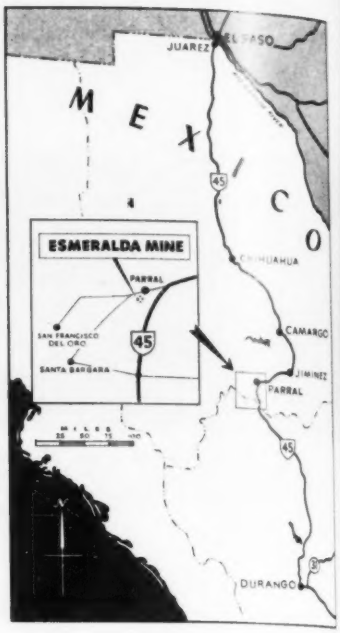
slots, and D. long hole shrinkage. The first of these was discarded as dangerous since the fractured hanging wall and back could not be inspected easily and bench mucking took too much of the drilling time.

Blast hole drilling was also eliminated because the vein was not consistently wide enough to use this method efficiently and the walls were too irregular to predict their trend in advance of stoping.

Sub-level slots were tried but the amount of development required was excessive and the difficulty in drilling and loading long downholes made the use of this method next to impossible.

In time, shrinkage stopes had developed the required reserve of broken ore and the mining rate was not required to exceed the milling rate. These stopes had been carried in the form of steep rills with drilling faces carried as close to each other as possible. Post-and-bar-mounted drifters were used and required considerable time in setting up; dry walls had to be built or footings mucked out. In an attempt to reduce this set-up time, the rills were flattened and fewer faces were used. This change lessened only slightly the set-up time. However, it was thought that by flattening the rills still further and using long (40- or 50-foot) drill holes, the set-up time could be averaged over the increased footage and its effect thereby lessened.

As drilling proceeds down the 200-foot stopes, the holes are blasted 45 feet behind the jumbo. Broken ore is then pulled from the nearest draw hole. The resulting craters are filled in and the muck pile leveled by slushing.



Long Hole Drilling Research

An exhaustive report was written by engineer Daniel Carreon on the results of the long hole drilling, pointing out the many problems encountered. Among them were: coupling breakage, steel breakage, wandering holes and stuck steels due to fractured ground, and difficulty in loading the holes. In commenting on these problems, Carreon said, "The drilling of these stope holes encountered minor difficulties, none of which could not be overcome; however, the hindrance which made the long hole drilling impractical was the failure to load most of the holes once they were drilled."

Though long hole drilling had failed to answer the stoping problem, a flatback shrinkage stope was still considered the most applicable method tried in view of the available labor supply and the nature of the deposit. Esmeralda's general manager, H. T. Blackwood, decided to try some sort of easily moved jumbo (to reduce set-up time) and to drill up-holes in the back so that the drilling face would be limited by vein width rather than by the height of muck as would be the case with horizontal holes. And further, it was decided to standardize by using a single size of steel to eliminate time-consuming steel changes, and by limiting the length of hole to a depth easily drilled by a single-use bit without losing gauge. The second of these requirements was met by the single-use bit made by Hayes Steel Products, Ltd. of Canada.

The railroad, the road and the river lead from the Esmeralda mine to the city of Parral at the far right. Parral is the center of a rich mining district that includes the towns of San Francisco del Oro and Santa Barbara—a district that has been continuously active since 1547. This area supplied much of the wealth of 16th and 17th century Spain. During the early years of Spanish rule, Parral was the capitol of what is now Chihuahua and Sonora, Mexico, as well as New Mexico, Arizona, and California in the United States.

A Joy M-W-6 wagon carriage capable of carrying two 3½-inch drills was ordered to be used as a stoping jumbo. This rig is mounted on three rubber tires and is a horizontal rectangular frame that supports a vertical A-frame, the top member of which is a horizontal bar that carries the two 14-foot chain feed drill sashes. The bar is directly over the two 21-inch rear wheels. This arrangement, together with the stabilizing spikes and the wheel brakes, lends the rigidity and stability that is required of the machine to resist stresses set up by stuck steels. A removable platform for the drillers is carried above the bar and between the drills. The end of the platform over the small (12-inch) front wheel is supported by two adjustable legs so that the platform can be leveled when setting up on uneven ground.

The jumbo frame was reinforced in the Esmeralda shops and the mounting arm was extended a foot on each end to provide the proper interval between drill holes—about 4½ feet. Both Ingersoll-Rand DA35 and Gardner Denver CF89 drills have been used. One-inch quarter octagon carbon steel shanked to 1⅛-inch lugged round steel is used in 12-foot lengths.

Jumbo Stoping Cycle

In developing a stope, the sill is widened to the width of the vein and opened to a height of 14 feet with conventional post-and-arm set-ups. The jumbo, knocked down, is carried into the stope through one of the 4- by 4-foot cribbed manways carried up with the broken ore. The rig is then assembled and drilling starts at one end of the stope. The first holes form a cut at the end of the stope and subsequent holes blast to this open face. With the exception of the cut holes, the machines drill all holes to an angle of 60°, controlled by the miners with a clinometer.

To form a flat, level floor for the jumbo, the broken ore pile is leveled after drawing enough muck from the stope to allow drilling clearance. The draw, of course, forms craters —usually near the hanging wall— that must be filled when leveling the floor. An Ingersoll-Rand H5N-N-1 double-drum utility hoist and Eimco 36-inch folding scraper are the units that make up the slushing arrangement. To provide the required flexibility in slushing, wire ropes are placed across the stope or along the stope walls and, at short intervals, carry loops to which the tail block can be fastened. To anchor the hoist, the two ends of a length of ⅝-inch wire rope are fastened to the sled base of the hoist and the bight is fastened to a short drill hole in one of the stope walls by means of an eye wedge. Boulders too large to handle easily are mudcapped and blasted before slushing.

Since the working area in many of Esmeralda's stopes is too large to be well lighted by cap lamps alone, a large carbide flood light and a long-beam Mine Safety Appliance Company electric lamp provide the illumination needed for slushing and drilling.

Blast holes are drilled in a pattern of rows across the vein with the holes on 4½-foot centers and rows separated by five or six feet.

The jumbo is placed with the drills and the frame in the line of the stope—parallel to the strike of

Esmeralda ore occurs in mineralized lenses carrying galena and sphalerite. The ore shown here is a lense separated from the hanging wall of the vein by one of the many minor faults that has made drilling difficult.

Comparison of Three Drilling Methods at Esmeralda Mine, Minas de Iguala, S. A., Parral Chihuahua, Mexico

Item	*Long Hole Drilling*	*Post- and-arm Drilling*	*Jumbo-Slusher Drilling*
Length of hole in feet	40 to 50	6	10
Feet drilled per machine shift	44.7	80.6	92.4
Tons per machine shift	39.2	38.2	87.0
Tons per foot drilled	0.88	0.47	0.93
Powder used—pounds per ton	0.50	0.56	0.44
Tons per man shift	19.0	15.3	24.6

the vein. Two holes are drilled and the machine is moved six feet along the strike and a second set of two holes is drilled. The jumbo then moves across the stope to complete the rows started.

Move Jumbo Easily

The brake-equipped wheels are pivoted to allow a 90° swing, making it a simple matter to move the jumbo either along or across the vein.

When the jumbo has moved far enough—about 45 feet—from the end of the stope to protect the machinery from flying rock, the cut holes are blasted and blasting continues with the drilling. As holes are blasted, enough rock is pulled through the nearest draw point to leave the floor level after slushing at the proper distance from the back.

Powder is loaded in the holes from a portable platform eight feet high. Gelatin 40 percent extra dynamite has been tried in the footwall holes, which have shown a tendency to bootleg, and Gelamex No. 2 in the rest of the holes. Fuse and caps are used to fire the holes; millisecond delays were tried but no improvement in fragmentation could be noted. The powder loader also bars down the stope and helps the slusher operator when not loading holes.

Slushing follows blasting closely so that the cycle of drilling, blasting, and slushing is continuous, yet without interference. This system allows the full shift for drilling, as well as for slushing, with blasting reserved for the end of the shift. A stope crew is made up of two drillers and a helper, one powder loader, and one slusher operator. Occasionally, both drills have been handled by one driller and a helper but it has been found that in general it is not practical because of fractured and ravelly ground.

Double-tracked main haulage ways are carried along the hanging wall side of the vein at 200-foot vertical intervals. Ore is drawn from the stopes through draw points at the end of 15-foot crosscuts driven at right angles to the haulageway into the foot wall side. The draw points are double or single, and air-powered shovels are used for loading. The double draw points are spaced at 50-foot intervals. Two raises are driven in opposite directions from the end of the crosscut in a plane normal to the crosscut with an inclination of approximately 45°. Ore is then drawn from either side of the crosscut. Control is effected by use of three rail tracks, the air shovel operating on the two rails closest to the point to be drawn. This double draw point, with three rail track was devised by Mario Fernandez, the present mine superintendent.

Where it is not necessary to pull muck out of the stopes at 25-foot intervals, single draw points are used. These are spaced at 50-foot intervals and the raise from the end of the crosscut is driven vertically to intersect the sill floor. Two-rail tracks are used.

Cars are spotted on the main haulage track and loaded from the side. The double haulageway track, with switching points at convenient intervals, prevents loading operations from interfering with normal haulage from adjacent stopes.

Mine Shops Important

Since the method—and the equipment as well—that Esmeralda is using, have been newly evolved, or are being used for entirely new purposes, the mine's machine shops, completely equipped for fabrication, repair, and maintenance, have had to redesign, rebuild, and fabricate much of the machinery. As an example, surface superintendent Charles Green and his assistant H. Beuttel have designed a device to quickly transfer air shovels from the main tracks to the crosscut tracks without using conventional switches. It consists of a low-slung rail truck carrying a swiveled section of track on which the shovel rides. When spotted at the switching point, the swiveled section is swung 90° and the shovel is driven off onto the desired set of crosscut rails.

The Minas de Iguala mine developments have been under the direct supervision of Vicente Cisneros, general superintendent, and M. Fernandez, mine superintendent.

For a production comparison between three of the drilling methods (long hole, post and arm, and jumbo-slusher) tried at the Esmeralda, see the accompanying table.

Information on Minas de Iguala developments will be continued in the September issue with an article on the Esmeralda differential flotation mill.

Mucking machines load ore directly from the end of a crosscut to cars spotted in the main haulageway.

The call has been sounded by the secretary, "Zinc, Gentlemen, Zinc," and in the London Metal Exchange's famous Ring, representatives of Exchange members begin the trading that will set the world's price for this metal, just as other similar sessions during the day set the prices for lead and tin. Dealing in copper resumes the fifth of this month for the first time since before World War II.

London Calls the Market Tune

Lead and zinc trading on the London Metal Exchange in the last year has affected every mine. This special report describes how the Exchange operates, how prices are set, and gives hope for rational copper sales

"London calls the market tune." "The tail is wagging the the dog again." Such are the comments of the large New York sellers of lead and zinc.

When the London price falls, a psychological reaction sets in —domestic buyers stop purchases believing that lower prices are ahead. Domestic sales cease, so that the only thing for producers (sellers) to do in order to sell their metal is to cut prices again.

United States demand for and use of both lead and zinc has held up surprisingly well. The tonnages sold in the United States are several times larger than in London, but the graph accompanying this article shows that London, indeed, has "called the tune."

In view of these facts, MINING WORLD sent its Chicago district manager, Karel Wegkamp, to London to confer with Patrick J. Sergeant, MINING WORLD'S London correspondent. Mr. Sergeant's long-time knowledge of the operations of the Exchange forms the basis for this report.

Base metal producers should find the report of particular interest, for whether they realize it or not, what is happening in the "Ring" even as they read this, may influence their mining decisions in the days ahead.— Ed.

For 2,000 years, on and off, metals have been traded in the City of London. Recent excavations suggest that the Greek and Roman merchants had some form of metal market established in their town on the Thames River. Remains of this forum were found near the site of the present London Metal Exchange which stands low and inconspicuous among the butchers' shops in Leadenhall Street.

The actual London Metal Exchange Company was established in the city's Lombard Court in 1877. Long before that, merchants and merchant bankers who shipped, financed, or distributed metals met informally in the Royal Exchange built by Sir Thomas Gresham during the reign of the first Queen Elizabeth.

Later, they used to meet in the Jerusalem Coffee House in Cowper Court and then in the Lombard Exchange and News Room in Lombard Street. The Metal Market and Exchange Company was incorporated on July 30, 1881. The present Exchange building—a small, one-story structure—was opened as a Terminal Market in 1882.

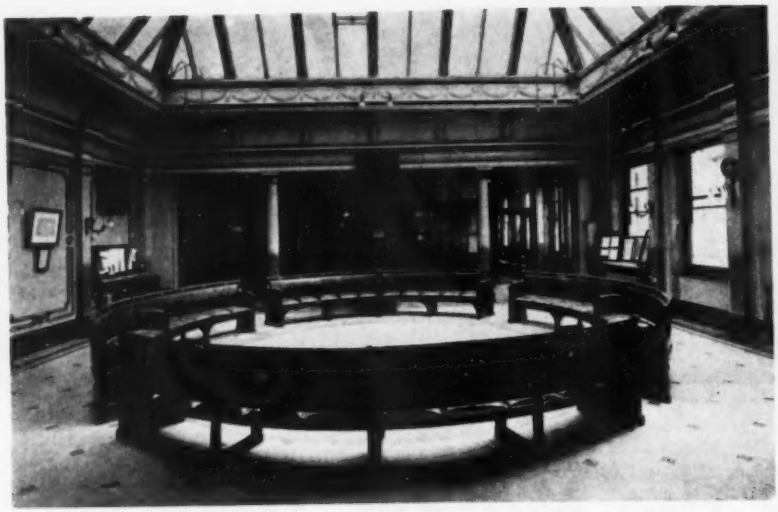
The market was formed because those engaged in the various aspects of the metal trades felt the need for the facilities which the market eventually provided. As mining output increased and nations became more and more industrialized, it became necessary for producers to be able to sell their products whenever they wished, in any quantity, and for any delivery date. Consumers needed similar facilities in order to be sure that they could buy their metal as and when it was wanted.

All felt the need for a daily list of quotations which would be recognized throughout the world as authoritative prices for standard articles. Only a free market could ensure this. The market drew up official contracts which specified closely the different brands to be sold. Later Standard Contracts were framed, and have been often revised, which classified the different metals according to quality. brand, shipment, and delivery.

Daily Official Prices

Official prices were, and still are, fixed daily. These prices have come to be recognized all over the world as the current value of the metal. The prices are used as the basis of contracts for metals, ores, and residues, made not only between the citizens of the United Kingdom and their customers abroad, but also between the citizens of one foreign country and another.

The importance of the Exchange, and its volume of transactions, grew with the size of the metal industry; this, in turn, necessitated some form of insurance against the risk of price fluctuation. Hedging facilities —mainly future dealings—were in-



LEFT: During the last year, the Ring at the London Metal Exchange has been the scene of trading sessions which have had marked effects on worldwide lead and zinc transactions. RIGHT: Behind the unimposing facade of the London Metal Exchange, each day's dealings in relatively small amounts of tin, lead, and zinc determine world prices and effect mine and mill production in all parts of the world.

troduced and are now being restored.

These facilities led to the London Metal Exchange becoming the most important in the world and its prosperity was reflected not only in its member firms but, also, in the allied shipping, banking, lighterage, insurance, and warehousing interests.

Other countries make great use of the Exchange's Arbitration Rules which have been an essential part of many thousands of contracts, not only for copper, tin, lead, and zinc, but for ores, scrap, and semi-finished products and for metals not officially quoted on the Exchange. Members are asked frequently to arbitrate in disputes in other countries "in accordance with the standards of the London Market."

Prewar Status Regained

The Market was closed during World War II and not reopened until November 15, 1949, and then only for trading in tin. Lead dealings were resumed on October 1, 1952 and zinc on January 2 of this year. The last to return will be copper on August 5. These dealings will mark the complete restoration of the London Market to its prewar activities.

Market days are Monday to Friday, public holidays and New Year's Day excluded. Dealing takes place in two sessions—morning (the official session) and afternoon (the unofficial session). Each session is divided into two parts separated by a 10-minute interval in the morning and a five-minute interval in the afternoon. Each metal is traded, in turn, for five minutes each, both before and after the interval. The order at present is tin, lead, and zinc, and the two sessions begin at noon and at 3:45 P. M.

The Exchange is a small, shabby building on one floor. All business is conducted around the famous Ring, a circular black band in the middle of the rubber flooring of the Exchange. Around it are four curved benches, on each of which sit 10 "Ring" members. Behind these benches, the nondealing members, such as the pressmen and the authorized and unauthorized clerks, sit or stand. Only representative subscribers—that is, partners or directors in the firms and companies who are members of the Exchange, or their authorized clerks—are allowed to deal in the Ring, and each man may represent only one company. One subscriber from each firm or company is entitled to a Ring seat; other subscribers dealing in the Ring are allowed to sit in courtesy seats.

Trading begins when the two big clocks show it is exactly the time for the dealings in each metal to start. The secretary calls out "Tin, Gentlemen, Tin," or whichever metal it is time to deal in. He then hangs a card above his head on which is written the name of the metal to be dealt in.

Members now make their bids or offers; on a busy day many may be doing so at the same time and the clerks have to be agile and well-trained to keep an accurate record of business. At the end of five minutes, a bell rings and the official closing prices are those ruling when the bell is rung. These official closing prices are fixed by a committee of three Ring Members, which changes periodically, and as soon as they are fixed they are flashed to every market in the world.

The next metal is then traded in the same manner.

Standard Contracts

Metal of the quality or qualities defined in the Standard Contracts is traded in parcels of five tons for tin and 25 tons for lead or zinc. The transaction may be for cash—delivery the following day—or for agreed succeeding market days up to three months ahead in the case of tin. Sales for lead and zinc are for "prompt" (delivery three days ahead or, if "ex-ship," within five days after the date of contract), or for the current month, or up to three months ahead.

The Standard Contracts classify different metals according to quality, brand, and delivery; they are altered from time to time to conform to metallurgical, industrial, and commercial developments. The contracts provide for the delivery of a named tonnage of a minimum purity and a brand which has been approved by the committee of the Exchange. The contracts also stipulate delivery place and date.

The Standard Contract for virgin zinc stipulates that the metal shall have a minimum zinc content of 98.0 percent. This is the contract for what is known as Good Ordinary Brand (G.O.B.) zinc and the quality wanted by the galvanizing trade which normally is the biggest domestic buyer of zinc. There are cer-

tracts for other, and purer, grades of zinc which command premiums over GOB zinc. Zinc and lead (for which there are similar arrangements) are sold for settlement in the current or the following three months.

The Standard Contracts specify tin of not less than 99.75 percent, and refined pig lead of minimum 99.97 percent purity. Tin metal must be in ingots or slabs weighing between 28 and about 120 pounds. For lead and zinc as pigs, slabs, etc., weight must not be more than 100 pounds each.

Sales in cash tin relate to metal on warrant—that is, in officially approved warehouses at English ports. These warrants are easily negotiable. In the case of prompt lead and zinc the seller has the option of delivery from approved warehouses or ex-wharf or ship free into river craft.

There is little doubt that the quantities handled by London have increased steadily over the years, with occasional fluctuations, although London's share of the world markets has probably fallen. Restrictive schemes, before the war and after the war, together with the tendencies of some big producers to sell directly to governments or big consumers, have in total reduced the proportion of metal passing through the markets.

Trading Volume

J. D. Wolff, chairman of the London Metal Exchange, said in a speech some years ago that the following quantities made up the volume of transactions in 1937: 711,373 tons of copper, 482,000 tons of lead, 234,700 tons of zinc, and 101,945 tons of tin. It is impossible to estimate the quantities dealt in since the war but here is a list of United Kingdom imports in 1952, a relatively slack year of easing prices. It is a partial guide to the sort of quantities the Exchange will be dealing in now that the English Government is out of the market: copper 383,000 tons valued at £90,000,000; lead 146,000 tons valued at £23,000,000; zinc 93,847 tons valued at £40,000,000; tin ore and concentrates 55,130 tons valued at £24,000,000.

In addition to these direct imports, it is likely that the London market will handle a considerable trade that does not pass, physically, through the country.

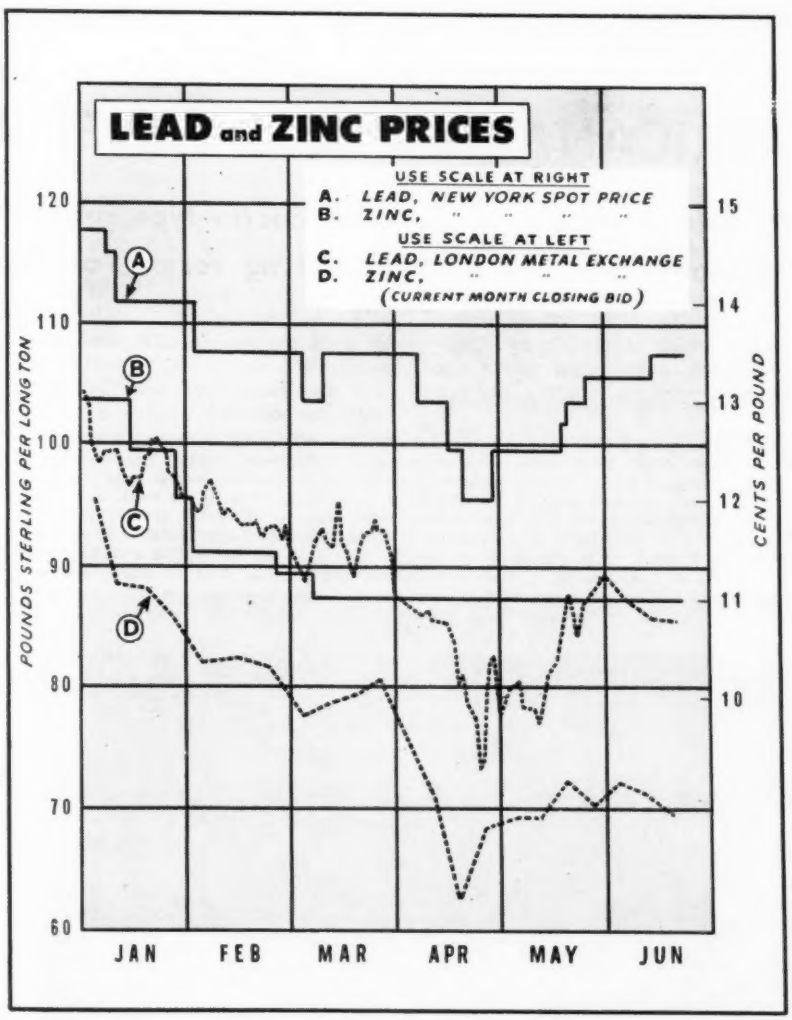
Future Government Sales

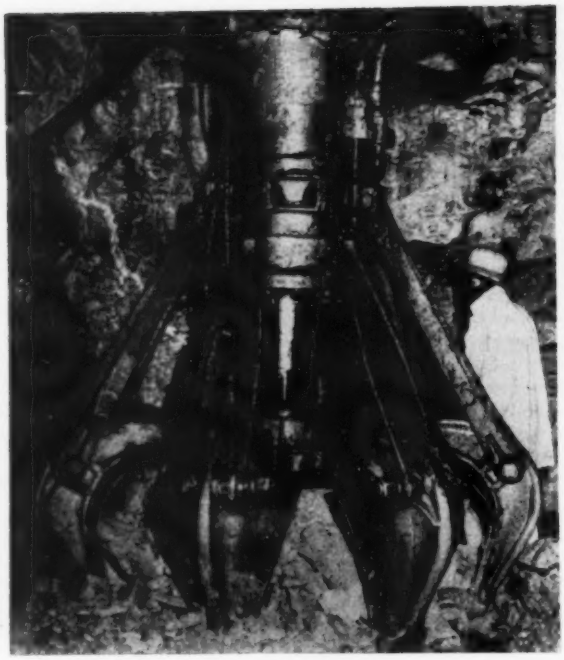
The market is only now getting into its stride after its long shut-down, and it is too soon to assess its importance in the postwar metal world. Several early problems which were troublesome have been overcome—notably the disposal of English government stocks of metal which were very large. Large quantities of lead and zinc were pressed onto an unwilling market in London and abroad, and much of it found its way to the United States causing a sharp break in prices there. Now however, it has been agreed between the interested parties that the British government will only supply prompt metal and then at a price above the market's. In other words, the government will only help out in an emergency and it will fine the buyer for getting into trouble. These arrangements are scheduled to hold true as copper trading is resumed.

Another difficulty experienced has been that of finance. Heavy taxation has depleted available capital while the higher prices of metals have made it necessary for merchants to have more money locked away in stocks.

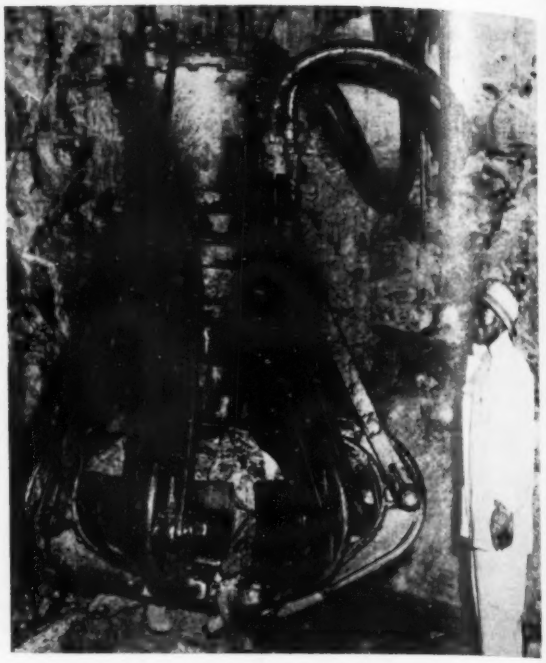
In London and in Liverpool, the banks will lend up to 80 percent of the value of metal for which warrants are held. However, when prices fall sharply merchants find that the banks require extra cover and this leads to some forced selling which only increases the price decline.

Generally speaking, the metal market is content to be back doing its proper job without Government interference. The powers of supervision enjoyed by the Bank of England are used only occasionally and then most tactfully. Market men realize that a far greater volume of trade is based on their prices than that which passes across the Ring; they are proud of that and determined that London shall stay where it has ever since the Greeks had a word for it—the center of the international mining trade.





The "Grab" digs into and under the broken rock. It is an air-operated, cactus type based on Priestman design, modified and built in the Vlakfontein mine shops.



As the eight fingers or "claws" are closed, the broken rock fills the grab which has a capacity of 20 cubic feet. An average of one ton of rock is loaded in each pass.

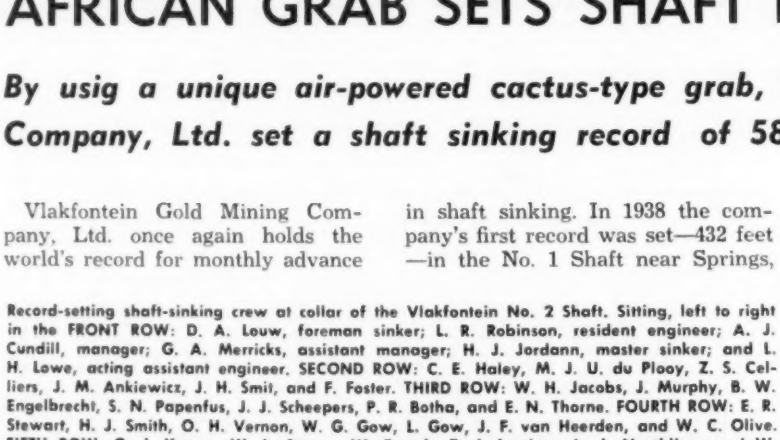
AFRICAN GRAB SETS SHAFT RECORD

By usig a unique air-powered cactus-type grab, Vlakfontein Gold Mining Company, Ltd. set a shaft sinking record of 585 feet during May 1953

Vlakfontein Gold Mining Company, Ltd. once again holds the world's record for monthly advance in shaft sinking. In 1938 the company's first record was set—432 feet—in the No. 1 Shaft near Springs, Transvaal, Union of South Africa. Vlakfontein is one of the mines of the Consolidated Goldfields of South Africa, Limited. In May 1953, 18 years later the new record of 585 feet was set by the company at its No. 2 Shaft. This broke the world record set in April 1951 by the Virginia Orange Free State Gold Mining Company, Ltd. at 504 feet.

Record-setting shaft-sinking crew at collar of the Vlakfontein No. 2 Shaft. Sitting, left to right in the FRONT ROW: D. A. Louw, foreman sinker; L. R. Robinson, resident engineer; A. J. Cundill, manager; G. A. Merricks, assistant manager; H. J. Jordann, master sinker; and L. H. Lowe, acting assistant engineer. SECOND ROW: C. E. Haley, M. J. U. du Plooy, Z. S. Celliers, J. M. Ankiewicz, J. H. Smit, and F. Foster. THIRD ROW: W. H. Jacobs, J. Murphy, B. W. Engelbrecht, S. N. Papenfus, J. J. Scheepers, P. R. Botha, and E. N. Thorne. FOURTH ROW: E. R. Stewart, H. J. Smith, O. H. Vernon, W. G. Gow, L. Gow, J. F. van Heerden, and W. C. Olive. FIFTH ROW: G. J. Kruger, W. L. Steven, W. French, T. J. Lessing, A. J. Neethling, and W. Kleynhans. The native sinkers and their machines are also shown, as are the two cactus "grabs" used in setting the new record.

"Grab" photographs by Alf Lees, Springs, Transvaal.

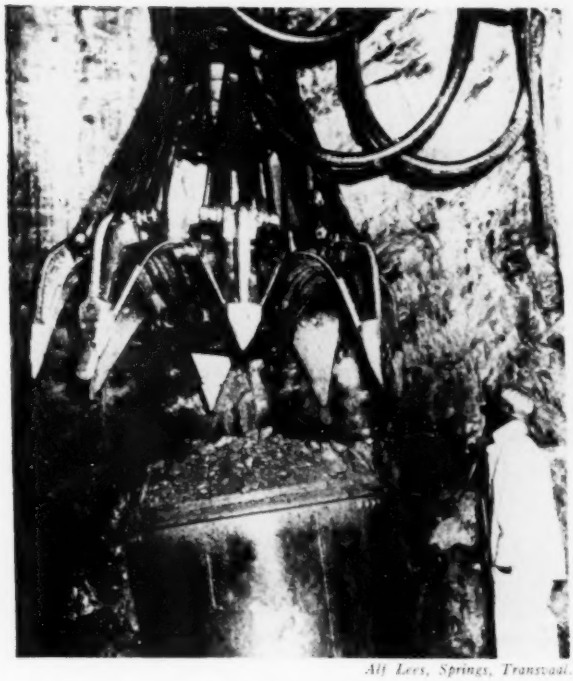


Cactus Type "Grab"

Of primary importance in setting the new record was the use of a cactus-type "grab" for mucking. Its use made possible twice the normal sinking rate under any given set of circumstances with only one-half the number of Native muckers. As many as 80 have been used in other shafts.

The success of the cactus "grab" is due to its design which makes the eight claws dig into and under the muck pile rather than scrape a load of muck together as the normal clam shell bucket does. Big muck posed no problems and the "grab" handled all pieces which

The loaded "grab" is hoisted free of the bottom, transferred across the shaft, and positioned over the bucket. Note the circular monorail (upper left), traversing carriage (middle top), and operator's cab (right center).



Alf Lees, Springs, Transvaal.

The "claws" are opened and the 5-ton bucket (90 cubic feet) filled to capacity. The bucket is loaded in an average of three minutes. Over 100 tons of rock per hour were loaded and hoisted.

were shorter than the 9-foot span of the teeth when the claws were fully open. During the record month, a 5-ton bucket, (90 cubic feet) was normally loaded in three minutes, and over 100 tons of rock were loaded and hoisted per hour. On a labor comparison basis, the "grab" handled 180 tons of broken rock per underground Native compared with 73 tons for hand mucking.

The claws of the "grab" are surfaced with tungsten carbide to minimize wear. The circular shaft (26-foot, 5-inch rock section diameter) has no corners which expedites mechanical mucking; however, the "grab" will not load all broken rock so, in the final clean up, the last fragments are hand mucked into the "grab" which is then hoisted over the bucket and dumped.

The "grab" is suspended beneath a steel frame which, in turn, is suspended from a circular monorail around the periphery of the three-deck sinking stage. (See vertical cross section of shaft bottom). The frame can be moved to any desired position around the shaft by an air-powered motor geared to a driving wheel on the monorail. A four-wheel car holding the elevating cable drum for the "grab" can, in turn, be moved back and forth transversely across the shaft. One man operates the circling and transversing motions, and controls the opening and closing of the "grab." He sits in a special cab below the frame in order to have an unobstructed view of the entire shaft bottom.

Sinking Cycle

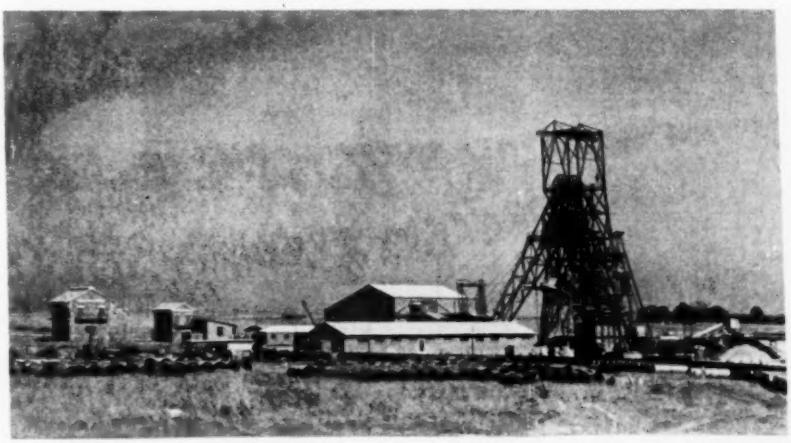
In the record setting month of May when the shaft was sunk from 3,348 to 3,933 feet, an average of 6.29 feet per shift was made. The average sinking cycle for an eight-hour shift was: preparing for mucking, 15 minutes; mucking, four hours; cleaning bottom, 45 minutes; drilling, one hour and 20 minutes; loading and blasting, one hour and 15 minutes; and delays (changing shifts, etc.), 25 minutes.

The round consists of 132 holes drilled in concentric rings to a depth of 7 feet with tungsten carbide-tipped steel. The holes were blasted with electric caps using seven delays. Average footage broken per round was 6.29 feet.

Three-Deck Sinking Stage

The shaft was sunk in the Kimberley quartzite (quartzite with

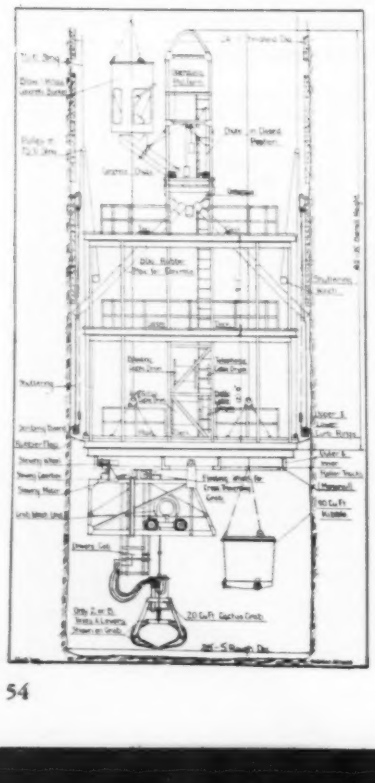
Shaft headframe and surface plant at the No. 2 shaft of the Vlakfontein Gold Mines, Ltd. where the world's record—585 feet of shaft—was sunk in May. When the shaft is completed to its projected depth of about 6,900 feet, it will hold another world record—the deepest single-lift vertical shaft.



Drilling crew at work in the bottom. Twenty-four machines were used for drilling a round.

conglomerates) of the Upper Witwatersrand series during May.

Use of a circular three-deck sinking stage, suspended in the shaft by four 1⅞-inch Lang lay cables from a four-drum surface hoist, made it possible to simultaneously place the concrete lining work in the bottom. The top deck of the stage is used mainly for extending pipes and service columns and for controlling the placing of concrete between the circular forms and rock. The middle deck carries the winch which lowers the forms. The lower, or main deck, carries the reels holding the blasting cable, lighting cable, telephone cable, and bell cable. The cables are reeled, or unreeled, as the stage is hoisted or lowered in the shaft. The "grab" and its positioning devices which were described previously are suspended below the lowermost deck. Buckets, fitted with a cross head which runs on 1¼-inch non-spin steel-rope guides, pass through a special opening in the stage. The stage can be hoisted at a maximum speed of 16 feet per minute. During mucking operations, four buckets are in continuous use.



All hoisting and lowering, except for the stage, was done by a double-drum, geared Robey hoist with drums 16 feet in diameter and 6 feet wide. The hoist is driven by two 2,350-horsepower electric motors. Rock hoisting speed was 3,000 feet per minute and the maximum speed handling men was 2,500 feet per minute.

Continuous Sink and Line

Continuous sinking and concrete lining are carried out on a planned schedule to continuously complete a finished section of shaft with the lining only a few feet behind sinking.

In contrast to the monolithic lining used in some other deep South African shafts, the No. 3 shaft lining is placed in successive concrete rings 11 feet high separated by 18-inch-high horizontal rock-lined openings.

These openings will support the permanent shaft steel compartmentation sets comprising buntons, dividers, etc. These sets will not support the walls in any way but will be grouted in place after sinking is completed. Present plans are to use the rope guides to full depth of 6,900 feet. However, if this proves impractical, the permanent steel work will be installed in the upper section of the shaft.

The movable steel forms rest on a steel curb ring which prevents the concrete from dropping out of the bottom of the form into the shaft. All concrete lining is poured during the drilling shift. Surface-mixed concrete is loaded into 62.5-cubic-foot capacity Blaw-Knox concrete buckets which are lowered to the top of the sinking stage. Buckets discharge into the concrete distributor (octopus) with the concrete flowing through 8-inch diameter hoses to the top of the steel forms.

Importance of Dry Shaft

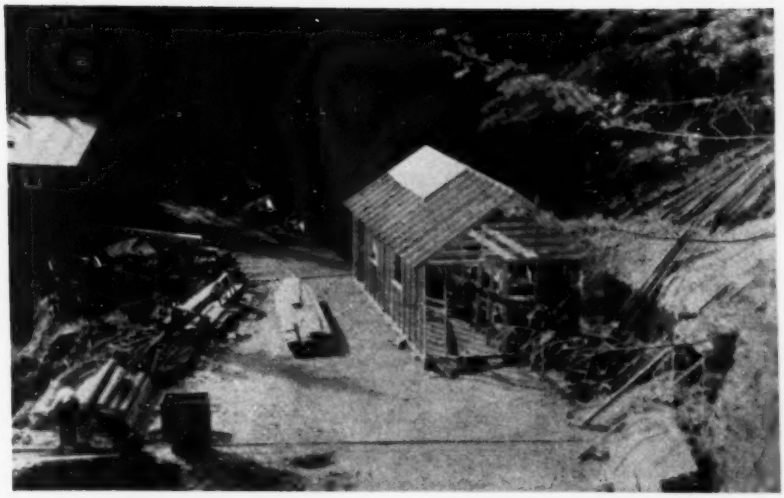
Because of the high rock temperature, it is necessary to keep the shaft as dry as possible and to forcefully ventilate it. Accordingly, shaft water rings collect water and channel it to sumps at 960-foot vertical intervals. Water encountered in sinking is hoisted to surface with the broken rock during mucking, pumped into the empty concrete buckets, and hoisted after their load has been dumped.

A Brown's centrifugal fan on the surface forces 22,000 cubic feet of air per minute into the shaft bottom through a 40-inch round galvanized pipe. The end of the pipe is maintained at 60 to 75 feet above the bottom. It is fitted with a nozzle tapering to 12 inches which increases flow velocity so that the air shoots to the bottom.

Advance of Sinking Science

The science of shaft sinking has reached its highest point in South Africa. The Virginia No. 3 Shaft record was remarkable. In the 25 months since that record was set, shaft sinking methods and equipment have developed at the fastest rate in history. The result of all past experience culminated in the new record. It will be hard to beat. Mining progress does not stand still and the record offers a real challenge to all mining engineers. For the good of all mining, let's hope the record will be beaten in less than another 25 months.

Milo Manz is the resident manager of Idaho operations for Northfield Mines, Inc.



Idaho's rugged Salmon National Forest is the scene of extensive exploration for cobalt mineralization. Northfield Mines, Inc., a Ventures, Ltd. subsidiary, recently completed an all-weather camp shown here during construction. The company's continuing exploration on copper-cobalt mineralization uncovered last year will cost about $450,000 during 1953.

NORTHFIELD EXPLORES IDAHO COBALT

In the Salmon National Forest near Cobalt, Idaho, Northfield, Mines, Ltd. uncovered copper-cobalt showings last year, has now expanded exploration

In Idaho's rugged, primitive Salmon National Forest exists the United States' most active cobalt district. Howe Sound Company, through its subsidiary, Calera Mining Company, is in production and the district for some years has been subject to extensive exploration by this and other companies. One of the most active in cobalt exploration is Northfield Mines, Inc., a subsidiary of Ventures, Ltd. of Canada. The company is directed by Thayer Lindsley, president; George W. Mitchell, vice president and general manager; and Milo Manz, resident manager in Idaho

Northfield Exploration

Northfield's properties, adjacent to Howe Sound's, are reached through Cobalt, Idaho, 40 miles from the town of Salmon. Heavy snow packs and the rugged, timbered terrain combine to make the area accessible only during the summer months and limit surface exploration to this period. Last year, however, a camp was completed to house Northfield's workers and staff, and an adit was started on mineralization uncovered by trenching. The active exploration period can therefore be extended this year and an extensive program has been outlined. Work done in 1952 was partially financed by a Defense Minerals Exploration Administration loan of $72,030. Actual expenditures amounted to over $100,000.

Completed Work

To date, over two miles of trenching by bulldozer have been completed, along with 3,000 feet of diamond drilling, 800 feet of underground workings (driven largely during the winter months), and campsite construction. Much of this work was based on data compiled from geochemical work in the area conducted in conjunction with the United States Geological Survey. Original survey and reconnaissance work done at Northfield's properties was contracted to Paul Bronken, mining and geological engineer for Bronken and Bronken, Boise, Idaho.

An adit has been driven 800 feet to check surface indication of vein structures. Two zones, one 60 feet wide and a second 40 feet wide, have been penetrated and cross-cutting is expected to encounter a third vein this year.

1953 Program

Underground exploration, preceded and partially guided by surface trenching and geochemical work, has penetrated two copper-cobalt-bearing zones of 60 and 40 feet called the "Merle 5." Assays of samples taken from the two zones indicate extensive cobalt-copper mineralization. Some of the samples assayed as high as 1.3 percent cobalt and 4.0 percent copper. A second occurrence, the "Merle 3," was uncovered by surface work about 800 feet to the west of "Merle 5" and a cross-cut will be driven to explore this second zone at greater depth. The entire 1953 program includes further cross-cutting and drifting, surface trenching, diamond drilling, and continuation by the company of geochemical prospecting. Before completion, the year's work will cost an estimated $450,000.

Shielded cables of the type shown in Photograph A are used on power shovels in large open pit mines. An unlocated fault in the shovel cable at this copper mine can be costly by causing shovel "down time."

By Roy A. Nelson
Test Engineer
Simplex Wire & Cable Co.

HOW TO FIND POWER CABLE FAULTS

Precision testing with DC and fault location by condenser-discharge method assure simplicity, portability, and safety in checking high-voltage cables

With the increasing use of ground current limiting devices providing for the safety of personnel, there is an equal need for a quick, accurate, and simple method for detecting and locating faults in portable shovel-cables. When current limiting reactors are used, the resulting damage to a faulted cable is slight, thereby making the faults unrecognizable by outward appearances. Therefore, a proven method that will locate a fault quickly and is non-destructive to the cable is described.

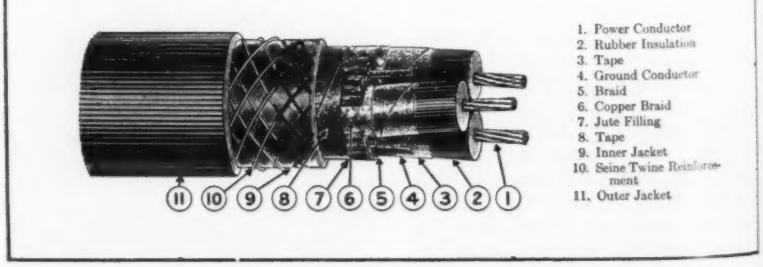
For voltages in excess of 2,000, the SH-D type cable is the most common, because it offers the greatest protection to personnel and cable. The construction of this cable is shown in photograph A; it consists of a copper braid over each insulated conductor, ground wires in the interstices, and a tough TIREX jacket overall.

There are two general types of faults found in open-pit mining SH-D shovel-cables, i.e., an open circuit and a short circuit. In practice, an open circuit is not too prominent, and when it does occur, it is usually accompanied by a weakness in the insulation at the point of discontinuity. Therefore, ground faults are the most common and are caused by physical injury to the cable in the mine.

Ground faults may be classified into two groups, i.e., (a) high resistance and (b) dead short. The high resistance fault is the most common and easiest to locate. This type of fault is between the copper conductor and the copper shielding braid and will vary in resistance, depending upon the nature of the defect. The dead short, or water fault, is not as common and is more difficult to locate. This fault is where the copper conductor is in contact with the braid and has negligible resistance.

Direct current is used because the testing apparatus can be economically manufactured which is light in weight, durable, and portable; in addition it will use very little energy from the line. Figure No. 1 shows a schematic diagram of a d-c test unit with an output of 30,000 volts dc—40 milliamperes, which is suitable for testing cables through 7,500 volts. The complete test unit is made in three packages which are quickly connected together by multi-conductor TIREX cords with

Photograph A. Construction details of the SH-D shovel cable. One bare ground wire of suitable size may be used in the center of Type SH-D cables in direct contact with the conductor shields instead of, or in addition to, the three braided ground wires shown.



polarized plugs on each end, as shown in Figure No. 1A.

Photograph B shows the front view of a desk-type control cabinet. The unit is enclosed in a ¾ inch plywood box 14 by 23 by 13 inches, weighing 50 pounds. Test and fault-locating operations are controlled from this panel. The front opens up as a desk for convenience of the operator in writing down meter readings.

The plate transformer is connected to the filament transformer. A short lead with battery clip on each end, suspended in air, connects the plate transformer to one side of the filament at the base of the socket. High voltage rectified d-c is taken from the plate or cap of the half-wave rectifier tube.

Photograph C is the back view of the three units and shows two TIREX cords connecting the units, and one two-conductor cord for the 115-volt ac input to excite test equipment. The control cabinet is separated from high voltage equipment for the safety of the operator.

To locate faults, the d-c test unit is modified by the addition of a spark gap and condenser, as shown in Figure No. 2. Figure No. 3 shows the physical dimensions of the spark gap, and No. 4 the condenser. If a pick-up device is needed, a pair of earphones connected to one earphone with the diaphragm removed, is very practical. To protect the test unit from high current surges, a 5,000-ohm carbon resistor mounted on stand-off insulators is used.

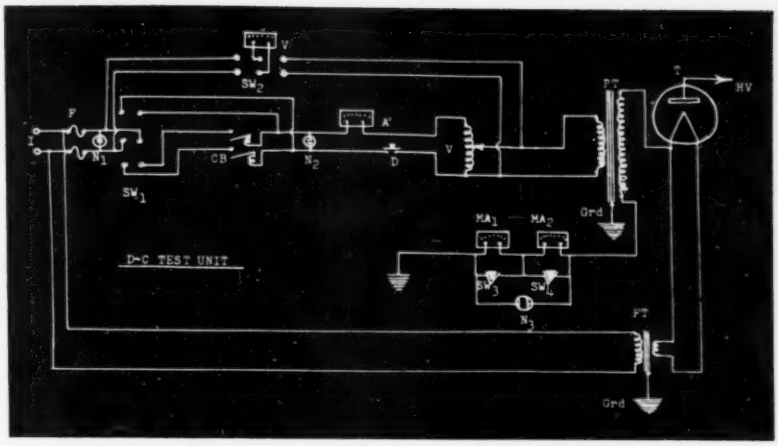


Figure No. 1. Schematic diagram of the d-c test unit:

- **(I)** Input: 115 volts, 50/60 cycles, 15 amperes.
- **(F)** Fuses, 12 amperes.
- **(N_2)** Neon indicating light—amber.
- **(SW_1)** Double-pole, double-throw switch.
- **(CB)** Circuit breaker: 5 amperes-time delay
- **(SW_2)** Double-pole, double-throw switch.
- **(V)** AC voltmeter: 0-150 volts.
- **(A)** AC ammeter: 0-10 amperes.
- **(D)** Dead-man switch.
- **(V)** Variac v 10, 10 amperes.
- **(PT)** Plate transformer: 115/20,000 volts, 40 MA output.
- **(FT)** Filament transformer: 115/5 volts, 10.5 amperes insulated for 40,000 volts dc.
- **(T)** Half-wave rectifier tube: 60,000 volt, inverse peak 250 MA, output 5.0 volt filament.
- **(MA_1)** DC milliammeter: 0-1 milliamperes.
- **(MA_2)** DC milliammeter: 0-50 milliamperes.
- **(SW_3)** Meter switch: push to open.
- **(SW_4)** Meter switch: push to open.
- **(N_3)** Neon indicating light—red.
- **(Grd)** Ground.
- **(HV)** High-voltage d-c output to cable under test, or fault locating, equipment.

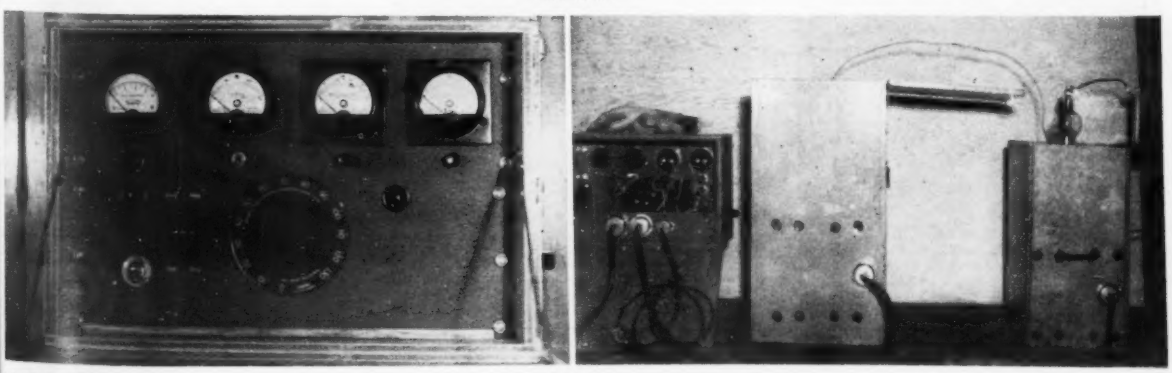
DC Testing Operation

The recommended procedure is to test the cable first by applying the voltage slowly to one conductor of the cable, grounding the other phases—shield and ground wire—to equipment and system ground. Because of the relatively small capacity of the d-c test unit, it is necessary to keep the initial charging current small. When the cable under test is fully charged, the current flow is the true leakage current which is registered on the milliammeter. The voltage is held for five minutes and the leakage current read at intervals to give a polarization curve as shown in Figure No. 5. The shape of the curve can be used to determine the electrical condition of the cable under test and to expose any potential weakness in the insulation. Further, by periodic d-c testing, the relative condition of the insulation of each phase can be obtained. It is the combination of applying high voltage and reading the leakage current that gives a true picture of the electrical condition of the cable. Tests may not only include the cable, but the splices, terminations, oil switches, current transformers and insulators as well. Test voltages for new cables are tabulated in the IPCEA specifications for rubber and varnished cambric insulation. However, this voltage may be varied according to the age of the cable, clearance on the ends, and the apparatus connected to the cable. Further, test voltage can be modified with experience and rigidity of requirements.

Fault Locating

When preliminary insulation tests indicate a defective conductor, the

LEFT: Photograph B. Front view of the desk-type control cabinet. RIGHT: Photograph C. Back view of the three units showing the TIREX cord connectors.



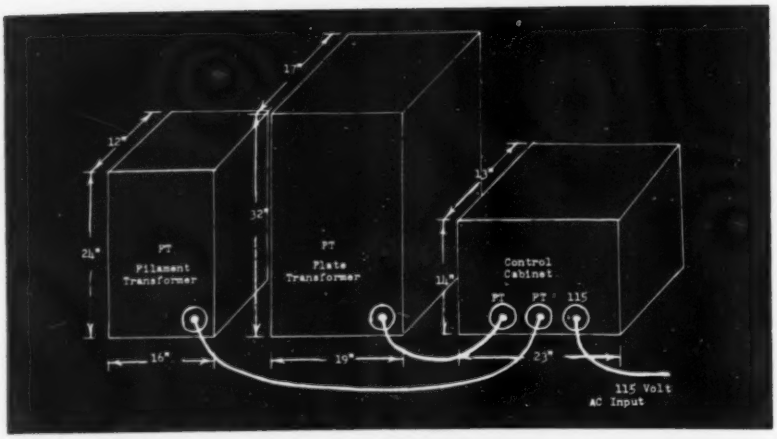
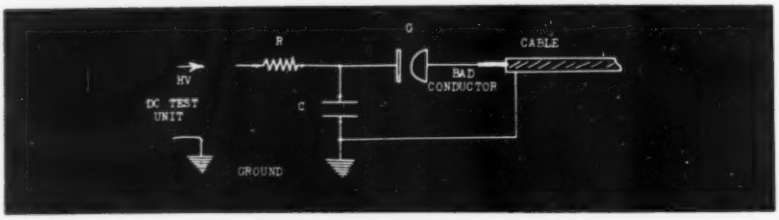


Figure No. 1 A. Arrangement for inter-connecting the three components to form the complete cable testing unit.



ABOVE: Figure No. 2. The d-c test unit is modified by the addition of a spark gap and condenser for locating cable faults. HV is the high voltage from plate of rectifier tube of d-c test unit. R is the 5,000-ohm resistor. C is the 1 MF 20,000-volt condenser, and G is the discharge gap. BELOW: Figure No. 3. Dimensions, in inches, of the spark gap.

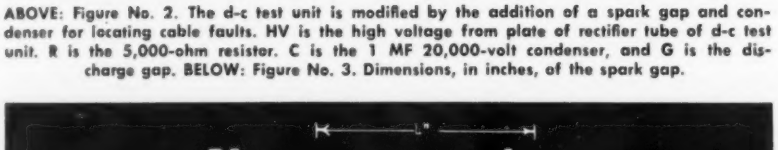


Figure No. 4. Dimensions, in inches, of the condenser.

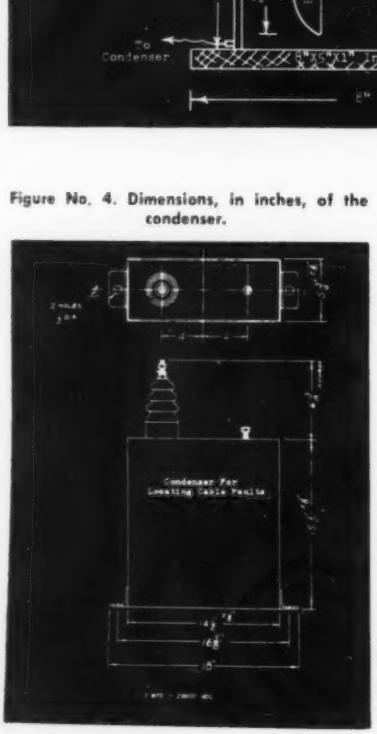
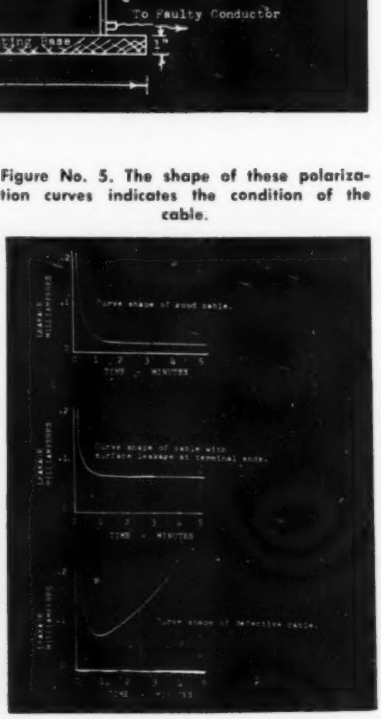


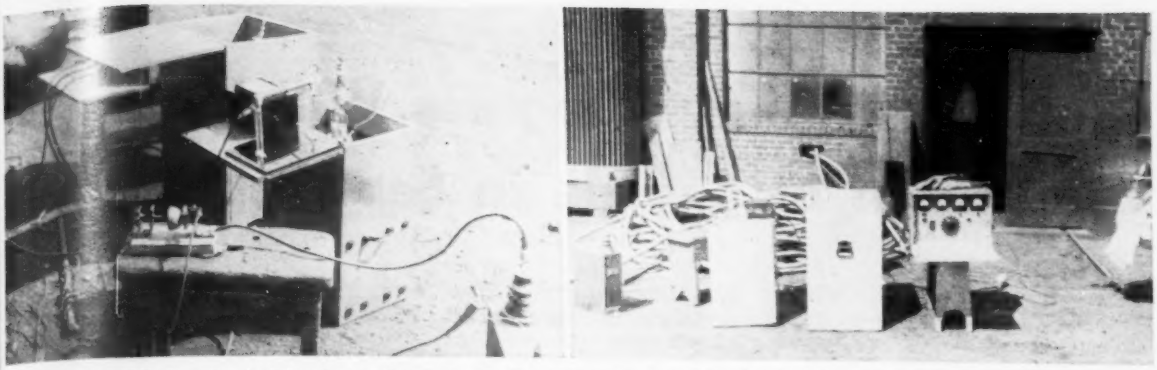
Figure No. 5. The shape of these polarization curves indicates the condition of the cable.



condenser-discharge meth is used to locate the fault, as own in photographs D. and E. h show the fault-locating equipm t set up for locating faults in a 5 shovel cable coiled outside a mi electrical shop. The electrician n locate the fault, repair it, and hen test it himself, before returning it to service.

The principle of operation in locating a fault or faults, regardless of resistance, is based upon picking up the discharges sent forth by the condenser and spark gap. A high d-c voltage is used to charge a condenser with the ground side connected to the cable ground wires, adjacent conductors, and shield. When the condenser is charged to a certain value it will flash across the sphere gap which is adjusted accordingly. The other side of the sphere gap is connected to the copper conductor of the faulty phase. A steep wave-front-pulse travels along the copper conductor until it reaches the fault. If the potential of the tracer signal is high enough, or the resistance of the fault is low enough, it will discharge across the fault to ground and return. If the tracer signal does not discharge across the fault to ground, then the cable will remain charged. In such cases, the pulse voltage must be increased by enlarging the sphere-gap distance until such value is reached as to flash across the fault. The maximum voltage applied to the cable is limited by the adjustment of the gap up to 20,000 volts d-c, and the minimum voltage is determined by the resistance of the fault. A small portion of the wave bypasses the fault and is reflected from the far end of the cable which will not affect the results. Figure No. 6 shows a sketch of how the tracer signal travels along a faulted conductor.

The method of locating the trouble depends upon the nature of the fault. If the fault is not a dead short or water soaked, the discharge signal is audible to the human ear and the operator has only to walk to the point of discharge to locate the fault. This type of fault, found mostly in shielded cables, can be located very easily and quickly. If the fault has a very low resistance, dead ground, or is under water, the discharge at the fault is not usually audible, and a pick-up device is required. The procedure is to move the earphone pick-up coil along the top surface of the cable, starting at the source of supply, and to listen for a change in signal, as shown in Figure No. 7.



Photographs D and E show the fault-locating equipment set up to locate faults in a 5-kv shovel cable coiled outside a mine electrical shop. Note the cable in Photograph H.

This type of fault, although not too frequent, is sometimes very difficult to find. Nonshielded cables, especially with steel armor on the outside, offer the biggest problem in fault location.

Safety

The correlation between safety and good work is very high; therefore, the importance of safety cannot be overemphasized, in using this equipment. Rubber gloves must be used at all times, and under no condition should the test unit be operated without a standby operator. All the packages of the test unit must be grounded at all times and checked periodically. The dead-man switch is used by the operator when tests are going on. The equipment should be roped off or placed in a safe location so that no outside man can run into the exposed wires. Although the shielded coaxial test lead offers some protection, caution must be exercised in guarding all exposed ends of the cable under test. Post danger signs in the area where the tests are going on. One of the safety features of this equipment is that the control cabinet is separate from the high potential transformers, so that the operator need not be near the high voltage.

Conclusion

Precision testing with direct current and fault location by the condenser-discharge method have been proven to be entirely practical for checking high-voltage mining cables. The use of these methods can be a factor in reducing the "down time" of the equipment which the cables serve, and thus lowers overall operating costs substantially. Simplicity, portability, and safety of operation makes such equipment an asset to mining engineers and electricians.

Photograph F. Arrow points to the fault which proved to be a pin hole within the circled area. It was not noticeable on the outside of the jacket until located.

Figure No. 6. Sketch indicating how the tracer signal travels along a faulted conductor. The steep wave front pulse travels along conductor to the fault where it flashes through to ground and returns back to the other side of condenser. A small portion of the wave by-passes the fault and is reflected from the far end of the line. The return path is usually a ground wire, metallic covering, or conductor of an adjacent cable.

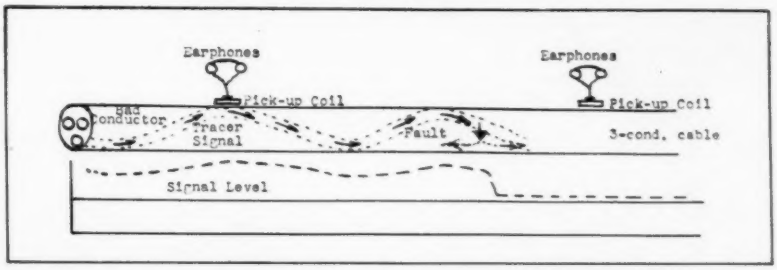
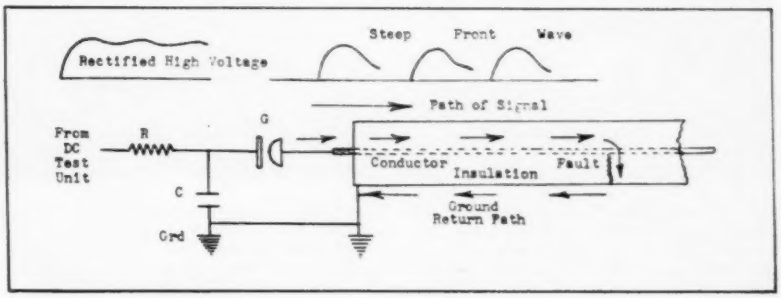


Figure No. 7. Tracer signal pattern in locating fault. BEFORE FAULT, signal is loudest when conductor is closest to the top of the cable, and diminishes slightly when the conductor is on the bottom of the cable. AFTER FAULT, the signal diminishes with equal intensity all around the cable; there is no signal on the conductor; and a weak signal on shields and ground wires of equal intensity.



American Mining Congress Will Hold Convention at Seattle in September

The 1953 Metal and Nonmetallic Mining Convention of the American Mining Congress will be held in Seattle, Washington, September 21 through 24. This is the first time in the 56-year history of the group that it has met in Seattle.

The national program committee met in June to draft the program which will include thorough discussion of such outstanding problems as public land law revision and administration, mine taxation, gold, silver and monetary policies, tariff, the present and future outlook for minerals and metals, uranium mining, small mine operations, and the status of defense agencies dealing with mining.

High Level Policy Review

A high point of the program will be the review of United States mineral policies by Secretary of the Interior Douglas McKay.

Separate sessions will be devoted to discussions of such important problems of mine and mill operation as mechanization, mine safety, drilling and rock breaking, shaft sinking, modern mining methods, roof support and rock bolting, milling and metallurgy, mineral exploration and open-pit mining.

Trips and Entertainment

An all-day trip to Victoria, British Columbia will highlight the agenda of field trips scheduled for that week. Other visits planned include Puget Sound Navy Yard; School of Mineral Engineering, University of Washington; Boeing Airplane Company; and the plants of Bethlehem Steel Company or the Northwest Lead Company.

On the entertainment side, there will be an informal luncheon for mining men and their ladies on September 21, and a dinner-dance that evening; a salmon derby before convention sessions begin on September 22, and the Annual Banquet on September 23.

The Ladies are Invited

The ladies are cordially invited to attend all convention functions and field trips—particularly the cruise to Victoria on September 24. They are requested to check in at Ladies Headquarters on the mezzanine at the Olympic Hotel which is official headquarters for the convention.

Roy M. Hardy, chairman of the western mining division of AMC, is general chairman of the convention; P. R. Bradley, Jr. is national chairman.

PROGRAM COMMITTEE PLANS IN SEATTLE

The National Program Committee met in Seattle June 16 to draft a convention program. Attending, left to right, were: John C. Fox, E. B. Douglas, L. J. Randall, P. E. Oscarson, Karl W. Jasper, R. D. Leisk, C. F. Holcomb, Roy B. Earling, Glenn Carrington, Joseph Daniels, E. C. Stephens, Norman E. Hanson, Julian D. Conover, P. R. Bradley, Jr., Robert M. Hardy, Joshua Green, L. A. Williams, J. C. Archibald, Jr., Frank Lilly, Kuno Doerr, D. A. Somerville, W. P. Morris, S. M. Strohecker, Jr., A. O. Bartell, Drury A. Pifer, William M. Yeaman, Frank N. Marr, and Geo. H. Waterman.

John D. Mitchell Tells of

LOST MINES AND BURIED TREASURES

DARK CANYON GOLD

For many, many years stories have been circulated throughout the West about the rich mines worked by the Spaniards in what is now the Mescalero Apache Indian Reservation. The eastern outlet for this country is down through Dark Canyon, a narrow crevice in the dark lava flow that covers the mesas to the west of the Pecos River. Dark Canyon lies between Carlsbad and White City, New Mexico.

The canyon is reached by a rough road that winds around the top of a long volcanic ridge infested with large, dark-colored rattlesnakes. The mesa country is thickly studded with mescal plants which furnished food for the Indians who, in days gone by, inhabited the Dark Canyon region. Proof of this is the blackened remains of their mescal pits which can still be seen.

Near the west end of the ridge the road suddenly drops down through a narrow canyon to Grapevine Springs. Along the bottom of the canyon are many oak and cottonwood trees. Grapevine Springs received its name from a large grapevine that climbs up the almost vertical wall to a height of more than 200 feet.

Old Spanish conductas (pack trains), carrying gold and silver bullion from the mines in the Guadalupe Mountains on the west side of the mesa, frequently camped at this spring. One such conducta was attacked by Indians at Grapevine Springs. The bones of the dead animals and the graves of the Indians and Mexicans who died in the battle may be found on top of the high mesa above the spring.

Rumor has it that the 25 jackloads of gold and silver bullion, headed for Horsehead Crossing on the Pecos, still lie buried near the spring.

These tales were so vivid I decided to try my luck at treasure hunting, despite the warnings from my guide that many new-fangled doodle-bugs had exploded when they approached too near to the treasure.

After eating our luncheon at the Spring, my guide "witched" with a forked stick cut from a mesquite tree, and I doodle-bugged up and down the narrow canyon. At a point among the oaks where the treasure is believed to lie buried we applied our most delicate art, or gift as he called it. Dark rain clouds hung low over the Guadalupes to the west and the distant flashes of lightning never failed to cause the needles on the dials of my machine to fleck. Not knowing the cause, my guide stayed at a safe distance expecting an explosion at any moment. However, nothing happened and the headphones did not indicate that any treasure was buried in the immediate vicinity. When we did not find the 25 jackloads among the oaks we prospected on down the narrow canyon toward the spring with the same result.

Shortly before nightfall, a goat herder drove his flock down from the high mesas and camped near us by the spring. As we inhaled the aroma of boiling coffee and frying bacon that evening, the old herder assured me that "mucho dinero" lies buried in that very place, and that it is guarded by the dead bodies of the Indians and Mexicans who were killed there.

During the rainy season, flash floods rush down Dark Canyon to the valley below. It may be that if any treasure ever was buried there, it was washed away by one of these floods.

From Grapevine Springs, the trail descends to Horsehead Crossing made famous by the Spaniards and later as a crossing over the Pecos River for the great herds of cattle that were driven north over the Chisholm Trail. It was in this same vicinity that old Ben Sublett is said to have found his gold nuggets.

The secret of the 25 jackloads of gold and silver bullion is as dark as Dark Canyon itself.

Attend

AMERICAN MINING CONGRESS

September 21-24
Seattle, Wash.

Not knowing the cause my guide stayed at a safe distance expecting an explosion at any moment.

ACTIVITIES OF U. S. MINING MEN

HAROLD L. CHILDRESS, general manager of the Buffalo and Mark Twain mining companies of Picher, Oklahoma, has been named president of the Tri-State Zinc and Lead Ore Producers Association. Mr. Childress succeeds O. W. BILHARZ who is president of the Bilharz Mining Company, Inc., of Baxter Springs, Kansas.

Richard S. Newlin, director and vice president of the Inspiration Consolidated Copper Company, has been elected president of the firm to fill the vacancy created by the death of **William D. Thornton,** formerly president and director. **H. Myles Jacob,** secretary-treasurer, has been elected a director of the company.

William N. Matheson, Jr., former assistant to the vice president in charge of operations of the Oliver Iron Mining Division of U. S. Steel Corporation, has been promoted to vice president in charge of sales and planning. Matheson has been with Oliver since 1933. **Lloyd S. Severson** has also been made a vice president of the company which has its headquarters in Duluth, Minnesota. Severson, who will be in charge of mineral development, has served on the board of Economic Welfare in Washington, D. C. Since his return to Oliver in 1944, he has been employed in the mining development and operation program.

Thomas L. Kesler has joined the staff of Foote Mineral Company of Philadelphia, Pennsylvania, as their geologist. Mr. Kesler will first be assigned to Foote's Kings Mountain Division in North Carolina. He received his B.S. and M.S. degrees in geology from the University of North Carolina and since his graduation he has worked for Shell Petroleum, the United States government, the Thompson Weiman Company at Cartersville, Georgia, and United States Steel Company. He has written many technical papers on non-metallic minerals in the Appalachian area and particularly on the Tin-Spodumene belt around Kings Mountain.

Ronald J. Morton has been named manager of research for Oliver Iron Mining Division of United States Steel Corporation. Mr. Morton, formerly a concentration engineer, will be responsible for Oliver's research and development work on taconite and low-grade ore concentration. He joined the firm in 1945 and worked on an experimental taconite program which resulted in construction of the experimental taconite concentration and agglomeration plants at Mt. Iron and Virginia, Minnesota.

Fred Howell, formerly chief geologist for Climax Molybdenum Company at Climax, Colorado, is now employed by the Haile Mining Company of Boulder City, Nevada. He will work on property examination involving travel throughout the United States.

Neele E. Stearns and **William G. Caples** have been elected vice presidents of Inland Steel Company which has its iron ore operations in Michigan. The two men will occupy newly created positions in the company's management. Mr. Stearns, who joined Inland in 1940, has been president of Inland Steel Products Company, a manufacturing subsidiary of Inland. He will be in charge of long-range planning activities for the company and will have general administrative responsibilities, including liason with Inland's subsidiary firms. Mr. Caples, former president of Inland Steel Container Company, a subsidiary, will be responsible for personnel administration, industrial relations, public relations, medical services, and management development.

Barney Dagan, Kaiser Steel Corporation's general superintendent, has been named works manager of the Fontana, California plant. Mr. Dagan, who has been with Kaiser since 1946, replaces **George B. McMeans** who is now vice president of operations.

D. C. Jackling has been elected chairman of the board of Mesabi Iron Company in Cleveland, Ohio, and **Erle V. Daveler** was elected president. Mr. Jackling is best known as the founder of Utah's copper and taconite indus-

JOHN H. EGGERS, left, president of the Mining Association of the Southwest, is seen with DR. ROBERT VIVIAN, dean of engineering of the University of Southern California, who recently reported to the association on the mineral resources of the Southwest Pacific. At the Los Angeles meeting, Mr. Vivian discussed his three-month survey of Southeast Asia, undertaken for the Mutual Security Agency. He said that there is a well-developed sulfur mining industry in Formosa though manual methods are used because of low labor costs and high equipment costs. Mr. Vivian described high-grade iron ore mines in Thailand, and noted that, due to absence of coal, the ore is reduced with charcoal. Tin and tungsten are mined, and some prospecting for lead and zinc ore is under way. Mr. Vivian also described tin dredging operations in Malaya, and mentioned a high-grade iron ore operation and Wolframite lignite and columbite deposits in the same area.

DAVID A. GOODKIND is replacing Colonel Lewis Sanders as president of the Ringwood Iron Mines, Inc. of Ringwood, New Jersey. Sanders will serve as president of the board of directors. Mr. Goodkind, former treasurer and director of Ringwood, is the senior member of David A. Goodkind & Company, certified public accountants and tax consultants of New York. The company which Goodkind will head has two separately developed mines—the Peters and the Cannon—both located on the company's 877 acre property in Ringwood.

try; Mr. Daveler is a vice president for American Zinc, Lead & Smelting Company. Mesabi Iron owns the property on which Reserve Mining Company operates.

Dr. R. L. Sebastian, chief industrial specialist in the raw materials, processes and economics of the light metals for the Office of Defense Management, has retired and will return to private practice. He maintains an office with **John W. Boyer** in Washington, D. C.

John E. Allen of the New Mexico Bureau of Mines and Mineral Resources is new president of the New Mexico Geological Society. **Phil T. Hayes** of the U. S. Geological Survey is secretary and **Ross Johnson** also of USGS, is treasurer.

H. D. (Hank) Clark and **Charles W. Yetter** have organized a new group known as Engineers Associates, Inc., with headquarters in Grand Junction, Colorado. The two engineers will act as uranium management and engineering consultants.

Elton T. Hight is now a mine foreman at the Noralyn mine of International Minerals and Chemicals Corporation's Florida Phosphate Division. He previously was employed as a draftsman by the Liphart Steel Company of Richmond Virginia and with the Virginia State Highway Department.

W. C. Page, vice president in charge of western mining operations for United States Smelting Refining and Mining Company, has succeeded **Sid H. Eliason** of Western Gypsum Company as chairman of the Utah Association of Chambers of Commerce.

New officers of the Southern Sierra sub-section, American Institute of Mining and Metallurgical Engineers, are: chairman, **E. C. Peterson,** mill superintendent at Anaconda Copper Mining Company's Darwin, California operations; vice chairman, **M. L. Otta,** mining engineer at the Trona, California property of American Potash & Chemicals Company; secretary trea-

(*Continued on page* 115)

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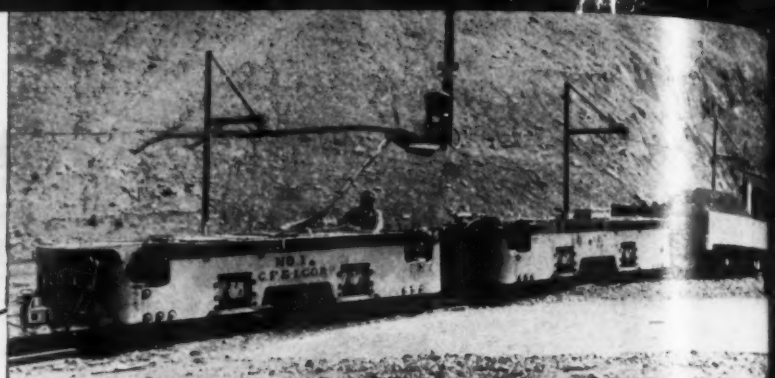

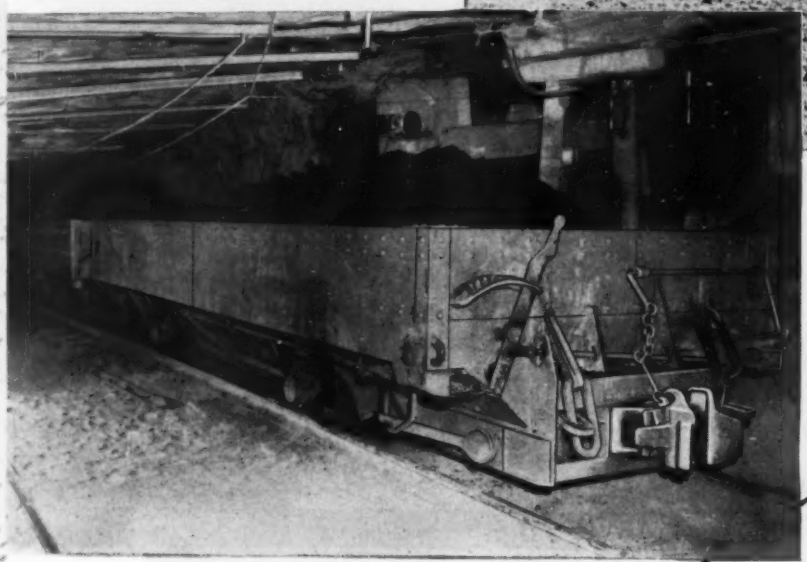

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ACTIVITIES OF INTERNATIONAL MINING MEN

J. ROY GORDON has been elected vice president and general manager of Canadian Operations of the International Nickel Company of Canada, Limited. He succeeds the late R. Leslie Beattie. Mr. Gordon joined Inco in 1936 as director of the research department at Copper Cliff, Ontario. In 1941 he was made an assistant to the vice president and in 1946, technical assistant to the vice president. He is a director of the Ontario Mining Association and served as its president in 1949-50.

Helmut Steck of the Lurgi Company of Frankfurt, Germany, is touring mining properties in the United States. Recently he spent three days on the Mesabi Range inspecting plant installations and studying United States technical improvements in mineral beneficiation.

Julius Kruttschnitt, chairman of the board of directors of Queensland, Australia's Mount Isa Mines, Ltd., has retired after 16 years but will remain as a director. **G. R. Fisher** will succeed him as chairman. **K. B. Gross** has been appointed general manager and director to replace **C. R. Hilton** who retired in April. Mr. Kruttschnitt also has been appointed to the advisory committee on uranium mining. Others appointed include **F. S. Anderson** of Consolidated Zinc Pty. Ltd., **H. G. Raggett** who is secretary of the Department of National Development, and **H. M. Murray** of Mount Lyell Mining and Railway Company, Ltd., all of Australia.

F. F. Espie is replacing **P. Moodie** as underground manager of Zinc Corporation Ltd., Broken Hill, New South Wales. Mr. Espie is the son of F. F. Espie, managing director of Western Mining Corporation Ltd., Kalgoorlie, Western Australia.

Clyde E. Weed has become president of the Cananea Consolidated Copper Company of Sonora, Mexico, filling a vacancy caused by the death of **William D. Thornton**. Mr. Weed, who was a director and a vice president, is also vice president in charge of operations for Cananea's parent company, Anaconda Copper Mining Company. **Edward S. McGlone**, a director and executive vice president of Anaconda, was elected vice president of Cananea.

Philip P. Powers, formerly of the Hecla Mining Company's Engineering Department, Burke, Idaho, now is with the Northern Peru Mining and Smelting Company, Toquepala unit, Casilla 303, Tacna, Peru.

George D. Bellows, former general manager of Empresa Minera Tanapaca, Mocoya, Via Eucaliptus, Bolivia, is now in Djakarta, Java, Indonesia.

N. K. S. Brodribb has been appointed chairman of the Australian Aluminum Commission, replacing **George Watson** who has resigned. Mr. Brodribb has been a director of Clyde Engineering. **W. Scott** has also resigned from the Aluminum Commission and will be replaced by **M. Mawby**, metallurgist.

A. Pekkan, mining engineer, is now with the Mutual Security Agency in Ankara, Turkey.

The Honorable J. T. Chappel, C.B.E., J. P., was recently elected president of the Federated Malay States Chamber of Mines for 1953-1954.

A. W. McNeil has been appointed manager of Chibulma Mines, Ltd., Southern Rhodesia. Formerly he was field manager for the firm and before that, mine superintendent at Roan Antelope Copper Mines, Ltd., Northern Rhodesia.

L. M. Abell is a mill superintendent with Cyprus Mines Corporation, Cyprus. He was with Emperor Mines, Ltd., in Fiji before assuming his new position.

C. Van Kooten, mining engineer, is with the Geological Mining Service in Paramaribo, Surinam.

H. M. Stiasny, formerly of Java, is now in Leiden, The Netherlands.

D. W. Read, former mill superintendent with Big Bell Mines, Ltd. in Western Australia, is now a metallurgical engineer with the South Australia Mines Department in Thebarton, South Australia.

S. Giorza is with Cam and Motor Mine in Eiffel Flats, Southern Rhodesia. He is also manager of the Queens Prize Mine.

N. R. Junner, formerly Director of the Geological Surveys of the Gold Coast and Sierra Leone, and, later, consulting geologist to the Selection Trust group, is now practising privately as a consultant with headquarters at Haslemere, Surrey, England.

R. A. COOPER, pictured here at the recent opening of the byproduct uranium plant of Daggafontein Mines Ltd. on the Far East Rand, Union of South Africa, was the first to discover and record the existence of a uranium oxide mineral in the gold ores of the Witwatersrand. His report was presented to the Chemical, Metallurgical and Mining Society of South Africa in October 1923.

M. DUHAN GARRETY, consulting mining geologist of Melbourne, Australia, is making a tour of mining districts in the United States and Canada. He is managing director of Northern Mines Development, N.L. and Australian Magnetite Proprietary Ltd.; he is also a director of Kelso Gold Mines, N.L., Central Deborah Gold Mines, and North Deborah Gold Mining Company. His tour includes stops at the Butte, Montana mines of Anaconda Copper Mining Company; the Climax, Colorado mine of Climax Molybdenum Company; Utah Mines Division of the Kennecott Copper Corporation; the Consolidated Mining and Smelting Company's Sullivan mine at Kimberley, British Columbia, and Trail smelter at Trail; and mines in the Coeur d'Alene district of Idaho. He is returning to Australia via London.

Jacques Priadkine has moved from the Ain Barbar to the Constantine property of St. Nouvelle des Mines d'Ain Barbar in Algeria, North Africa.

Folke Wallman, mining engineer at the Boliden Mining Company in Boliden, Sweden has been appointed manager of the Kantorp mines in central Sweden.

J. M. Symonds, chief metallurgical engineer from Cia. Minera de Penoles S. A. of Mexico, is in New York.

Overseas members attending the Fifth Empire Mining and Metallurgical Congress held in Australia recently include **A. M. Bensusan**, Southern Rhodesia; **A. Blatchford**, **W. G. Burns**, and **C. W. Cayzer**, Vatukoula, Fiji Islands; **R. C. Clarke**, Hong Kong; **W. W. Connor**, London, England; **F. Edmond**, Surrey, England; **P. Evrard**, Bruxelles, Belgium; **M. Falcon**, Johannesburg, South Africa; **H. R. Banks**, **J. Convey**, **Professor F. A. Forward**, Canada; **W. Garven**, North Ireland; **Professor G. A. Gillies**, Canada; **Professor J. I. Graham**, Dunedin, New Zealand; **D. H. Gray**, Blyvoorvitzicht, Transvaal, South Africa; **P. L. Gupta**, Lancashire, England; **J. Hancock**, Glasgow, Scotland; **D. G. Hemmant**, London, England; **H. W. Hockin**, Kuala Lumpur, Malaya; **I. G. Hughes**, Saltpond, Gold Coast, South Africa; **R. E. W. Hughes**, Southwest Africa; **K. W. B. Iten**, Peru; **G. H. Muskett**, Vatukoula, Fiji Islands; **G. Y. Nisbet**, Transvaal, South Africa; **W. Ralston**, Salisbury, Southern Rhodesia; **J. Cranmer Roberts**, Vatukoula, Fiji Islands; **J. E. Ross**, Blyvoorvitzicht, Transvaal, South Africa; **Dr. H. Sargent**, British Columbia, Canada; **Dr. S. H. Shaw**, London, England; **J. H. Shepherd**, Springs, Transvaal, South Africa; **R. O. Stokes**, London, England; **E. B. Thomas**, Nigeria; **Dr. D. N. Wadia**, New Delhi, India; **Professor M. Y. Williams**, Vancouver, British Columbia, Canada.

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But a powerful Caterpillar Motor Grader can change that picture. With frame and power train designed and built to match engine capacity, you get the toughest work done quickly. A blade that stays put, a constant mesh transmission, and unobstructed visibility make Cat* Motor Graders the operators' choice.

It will be your choice, too, because you get more and better work done when the machine and operator work together.

The 100-horsepower Cat No. 12 Motor Grader above keeps the gravel pit haul road of Marquette Cement Manufacturing Co. at Oglesby, Ill., smoothly ready for all traffic. In addition, this all-around work horse ditches and does general chores around pits and dump areas.

One source of responsibility for engine and frame means savings for you. Your Caterpillar Dealer is always ready to serve you. Ask for a demonstration and you'll see why 99 per cent of all Cat Motor Graders built are still in use – still making money for their owners.

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INTERNATIONAL NEWS

U.S. To Get Copper-Cobalt From N. Rhodesian Loan

Under a $22,400,000 loan agreement negotiated through the Export-Import Bank, the United States will receive copper and cobalt from four Northern Rhodesian mining companies beginning in mid-1957.

The Rhodesian Congo Border Power Corporation, Ltd. will use the money borrowed from the bank to pay about two-thirds of the cost of new electric power facilities which it will erect in the copperbelt. These increased facilities will enable Rhokana Corporation, Ltd., N'Changa Consolidated Copper Mines, Ltd., Mufulira Copper Mines, Ltd., and Roan Antelope Copper Mines, Ltd. to expand their production of copper and cobalt.

The loan, plus interest, will be repaid by the power corporation with metal from this increased production. The United States Defense Materials Procurement Agency will buy the metal at market price.

British Columbia Firm To Produce Nickel For DMPA

Western Nickel, a wholly-owned subsidiary of Pacific Nickel Mines, Ltd. of Vancouver, has signed a contract with the U. S. Defense Materials Procurement Agency for the production of up to 56,000,000 pounds of refined nickel from an undeveloped deposit in British Columbia. The project, to be partially financed by Newmont Mining Corporation of New York, will involve expenditures totaling about $4,750,000.

At its own expense the company will explore the ore body in the Yale district of British Columbia and the government will advance half the cost for development of property for large-scale mining.

If, after the development program is completed, the company and the government agree to continue with production, the government will advance up to $2,625,000 and the company will finance $950,000 for necessary facilities. The contract provides that all the nickel will be sold to the government. Government advances will be repayable with interest as production, scheduled to start March 1, 1955, proceeds.

Production will continue for seven years at the rate of 6,000,000 pounds of refined nickel per year. Refining will be done by Sherritt Gordon Mines, Ltd. at its plant in Fort Saskatchewan, Alberta. The government will pay market price (at time of delivery) f.o.b., Port Colborne, Ontario, but will accept delivery at Fort Saskatchewan.

If production runs over 6,000,000 pounds a year, the company has an option to sell the government an additional 2,000,000 pounds a year, and the government has an option to buy an additional 1,000,000 pounds a year in the event the company does not exercise its option. Options run for seven years at market price or 56.50c a pound, f.o.b. Fort Saskatchewan, whichever is higher.

Joint Ventures Planned By Burmese Government

The Burmese government has found that its joint venture with Burma Mines Limited in operating the Bawdin silver-lead-zinc mine in the Shan States of northern Burma has been very successful. (See Mining World, July 1953, p. 68)

The government is now making plans to begin similar ventures and in each case will leave matters concerning technical operations and management up to the individual firms.

Extended Tax Concessions To Include New Minerals

Australian tax concessions on profits and dividends earned from mining certain metals have been extended until 1960, and new legislation provides for an exemption from income tax of 20 percent of the profits earned from the metals and dividends paid out of those profits.

The concessions were due to end on June 30, but the government has now extended them for seven years, and has included other minerals to which the concessions did not previously apply.

New metals and minerals brought under the concessions are bismuth, columbium, osmiridium, platinum, selenium or tellurium, chromite, fluorspar, ilmenite, monazite, pyrite, vermiculite, and zircon.

The existing concessions apply to antimony, arsenic, beryllium, copper, lithium, mercury, molybdenum, nickel, strontium, tantalum, tin, tungsten, vanadium, asbestos, emery, graphite, kyanite, manganese oxides, mica, quartz crystals, rutile, and sillimanite.

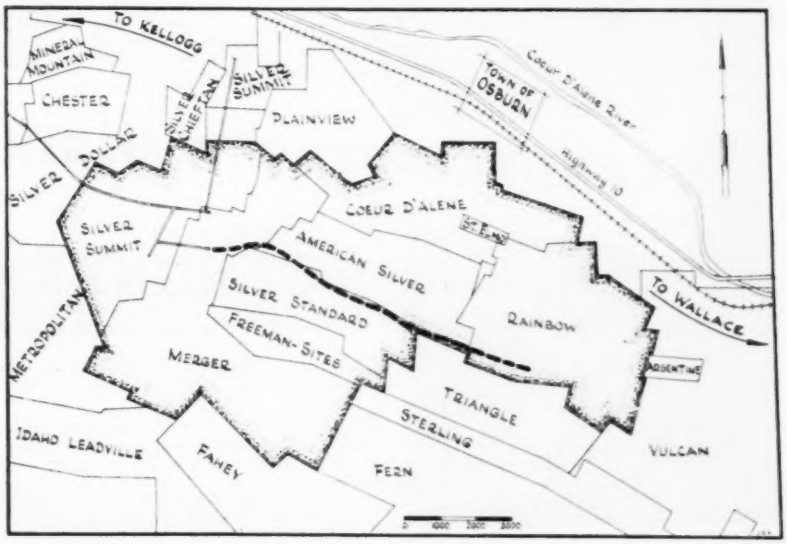
Polaris Obtains DMEA Loan For Sea-Level Exploration

A $348,000 lead-zinc-copper-antimony loan has been granted to the Polaris Mining Company by the Defense Minerals Exploration Administration to pay half the estimated cost of a proposed sea-level exploration project which Polaris is undertaking in the Coeur d'Alene mining region south of Osburn, Idaho. The application for an exploration loan had been denied previously because lead, zinc, and 17 other minerals were no longer considered in critically short supply. Now, under a new policy, Polaris' loan application is one of 15 in the Northwest to be reinstated.

The area to be explored lies between the company's Silver Summit mine and the Vulcan mine (formerly the Galena) now being operated under lease by the American Smelting and Refining Company. The longest exploration drift ever undertaken in the district is a part of this project. Its tentative course is indicated on the accompanying map. It will extend about 10,000 feet easterly from the face of a drift previously driven 550 feet into property of Merger Mines Corporation from the 3,000-foot level of the Silver Summit mine. An additional 1,000 feet of Merger ground will also be explored, as will 7,200 feet of Silver Standard Mining Company and American Silver Mining Company ground and 1,800 feet of Rainbow Mining and Milling Company ground.

To connect with Coeur d'Alene Mines Corporation's 2,800-foot level, a 330-foot raise is to be made on the American Silver "wire silver" vein. Also planned are 15,000 feet of diamond drilling into walls of the drift and 1,500 feet of crosscutting from the lateral.

Place-fix map shows route of Polaris' proposed sea-level exploration drift.



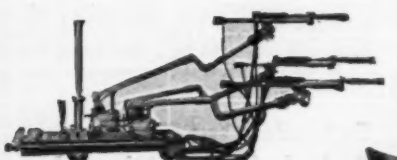
cut corners from time schedules and cost estimates with...

DEEP HOLE DRILL—The NEW SFH99—with Gardner-Denver Sectional Rods—permits a 4' change when ring drilling from a 7' drift.

STOPER—Balanced to boost production.

SINKER—Drives sinking costs to bed rock.

DRIFTER—A fast driller—with a long feed.

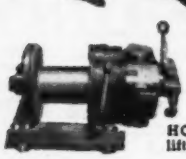


JUMBO—For a quick set up and get out.

LOADER—A quick pick-up for profits.

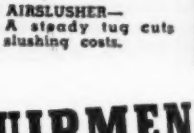
PORTABLE COMPRESSOR—Moves air right in—anywhere.

STATIONARY COMPRESSOR—Cuts air costs at the source.

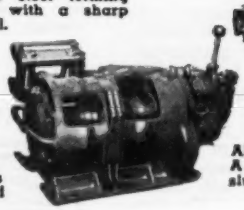


HOIST—Gives a lift to productivity.

SHARPENER—If you figure steel forming costs with a sharp pencil.



LINE OILER—Automatically saves wear on rock drills.



AIRSLUSHER—A steady tug cuts slushing costs.

SUMP PUMP—Sucks nuisance water out of the way.

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THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Canadian Firms to Merge Colombia, S.A., Holdings

Nechi Consolidated Dredging, Ltd. whose dredging areas are adjacent to those of Pato Consolidated Gold Dredging, Ltd. on the Nechi River in the Zaragoza district, Department of Antioquia, Colombia, South America, will merge with the latter company. Nechi properties have a total area of about 124,000 acres.

Both companies are affiliates of Placer Development, Ltd. All three have home offices in Vancouver, B.C. Under terms of the merger, Pato will purchase from Placer its 2,000,000 shares of Nechi for $800,000 and then will buy, for $2,000,000, all of Nechi's properties and assets. Nechi will be liquidated and Pato will issue 302,500 of its own shares for distribution among Nechi shareholders.

U.S. Prepares to Purchase Bolivia Tin Concentrates

The United States government has announced that it is prepared to contract with Bolivia for purchase of tin concentrates at the world market price in effect at time of delivery. Negotiations for the one-year contract will probably be undertaken by the Reconstruction Finance Corporation.

The amount of tin to be bought is as yet undecided but in the past, the U.S. has bought up to 17,000 metric tons of tin concentrate a year from Bolivia.

Major obstacle to contract talks was recently removed when the Bolivian government disclosed plans for compensating stockholders in Patino Mines and Enterprises Consolidated's tin mines. For details see Latin American section of this issue of MINING WORLD.

EUROPE

AUSTRIA—Lead and zinc are to be mined in the north Tyrolean area near Lafatsch. The *Bleiberger Bergwerks Union* (Mining Union) has just completed a 2,000-foot-long tunnel to reach rich deposits which start about 500 feet beyond the *Fugger* mine. Mining operations are scheduled to start immediately. Two other lead mines have ceased operating. The *Vassereith* mine, operated by the *Bergwerkschaft Distentritt*, reported exhaustion of its known deposit, and a 3,000-foot-long crosscut to reach other possible deposits cannot be made because of lack of capital. The research geologic work in the Toesens area in the upper Inn Valley has also been stopped because of insufficient capital.

CZECHOSLOVAKIA—A new magnesite mine has been opened in the Slovakian area near Lubenick. The *Lubenick* mine will supply 60 percent of the total Czech requirements for this material, needed for refractories in the furnaces of the nationalized industry.

HUNGARY—The first shipments of Soviet iron ore was sent to the *Sztalinvaros Combine* in May. The ore was routed via the Danube River to Czepel Harbor, and was trans-shipped from there by rail. This is reported to be the first consignment of Soviet ore for the slowly expanding *Stalin City Iron and Steel Combine*.

WEST GERMANY—Copper mines have been adversely affected by the world price decline in West Germany, as elsewhere. The *Sontra* copper mines have been kept open by state assistance, with production maintained by concentrating operations on the richer ore bodies. Copper ore production has averaged about 200 metric tons of contained copper per month. Despite the closing and curtailment of zinc mining operations, output increased from about 6,700 metric tons in the first three quarters of 1952 to 7,200 tons in the fourth quarter of 1952 and the first quarter of 1953. Lead output rose from about 4,300 tons to 4,800 tons monthly average.

WALES—*Halkyn District United Mines, Ltd.* in Flintshire milled 29,123 tons of ore during 1952, from which 2,590 tons of lead concentrate and 353 tons of zinc concentrate were produced.

NORWAY—The *Undal* mine in central Norway, now in production, will have an initial output of 9,000 tons per year of pyrite. This figure may be increased to 20,000 or 30,000 tons per year later, as development work continues in the mine.

SOVIET UNION—According to the leading Soviet Metallurgist, Professor I. P. Bardin, writing in "Pravda," the Union's iron and steel industry has been forced to turn to lower grades of iron ore as its richer deposits are depleted. The two major sources being depleted are reported to be at Krivoi Rog in the Ukraine and at Magnitogorsk in the southern Urals. The ore is said to have dropped from 60 percent iron to 40 percent, and must now go through expensive processing before it can be used in blast furnaces. Although the Soviet Union has large untouched rich deposits, they are generally located too far from present production centers, and would require large capital investments to develop them.

WEST GERMANY—Aluminum output will be increased to about 120,000 tons per year when reconstruction is completed at several West German aluminum plants. The *Vereinigten Aluminiumwerke* has plants at Toeging, Leunen, and Greverbroich, and *AIAG* and *Rheinfelden* each have plants which are under the reconstruction program.

NORWAY—The Norwegian government plans to spend £100,000 this year on further exploration of the *Dunderland* iron ore fields in north Norway. Test drilling made so far have proved the existence of about 200,000,000 tons of ore, and it is believed that there is considerably more. Additional drillings are scheduled for this year, along with the establishment of several pilot plants for concentrating the ore. As the Dunderland ore contains only 33 percent iron, a considerable amount of refining will be necessary to secure a concentrate for marketing. Concentration also creates a number of problems which will be examined in the new refining laboratory now under construction at the Technical College at Tronheim.

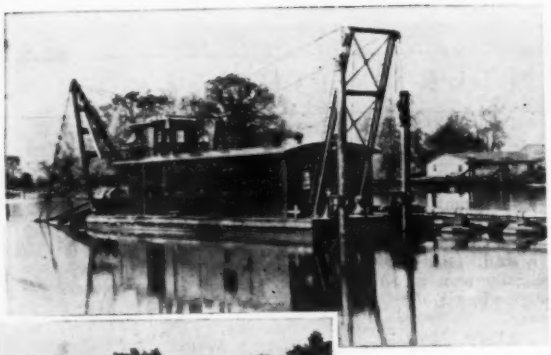
AUSTRIA—*Donau Chemie A. G.* has announced that the quartz mine near Brenner Pass will not be reactivated. All efforts will be directed toward the *Pettnau* quartz mine in the Landeck district of Tyrol which was opened in April of this year.

HUNGARY—A barter agreement has been signed with China. Hungary will receive mining products in exchange for mining machinery.

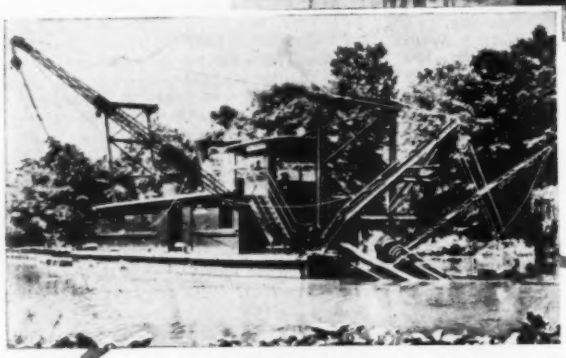
AUSTRIA—A slight increase in the production volume of Austrian mining was reported for the first quarter of 1953. Iron ore production averaged 225,000

MINING OPERATIONS IN FINLAND

Two nonmetallic mining operations in Finland are shown in the photographs above. The headframe at the asbestos mine of Sumonen Mineraali Oy at Paakkila is shown at the right, where an 8- by 10-foot, three compartment shaft 260 feet deep has been completed. Annual production is about 10,000 tons of high-grade asbestos fiber. The operation at the left is a feldspar quarry at Kaatiala also operated by Sumonen. Annual production here is about 10,000 tons of feldspar.



"Indian Lake" dredge, powered by 8 cylinder, 4-cycle Superior Diesel rated at 260 HP.



"Portage Lake" dredge powered by supercharged Superior Diesel developing 450 HP.

SUCTION DREDGES
powered by SUPERIOR DIESELS

keep boat channels clear and build permanent land fill for Ohio's Division of Parks

The development of Indian Lake recreational area at Russels Point, Ohio, required the removal of silt deposits to clear boat channels and overcome shoreline muddiness resulting from agitation of the silt.

In 1948 an American Steel suction dredge powered by a Superior Diesel was placed in service. Since that time the Superior Diesel has performed dependably and without interruption during thousands of hours of severe, continuous operation during each season, with negligible maintenance costs.

Park Manager Colvin comments, "The Superior has never given a minute's trouble—in fact, the performance of this unit led us to purchase another of the same model to power a new dredge for Portage Lakes."

The Portage Lakes dredge is now in operation—its task is to move *more than a half million yards* of silt to clear the lakes. The pump, driven by its supercharged 4-cycle Superior Diesel handles 1500 to 2000 yards each working day.

Captain Herbert Lewellin, who is in charge of dredge operations at Portage Lakes, says, "Our Superior engine assures us dependable, fast starts and gives excellent performance under any load conditions. We have never had a bit of trouble with this power unit and I can also say that during my entire 37 years of dredging, I have never worked with an engine I like better."

That's the kind of service you can expect from Superior and Atlas Diesels regardless of the way you use them—for dredging, propulsion, power generation, or wherever else you need dependable engines. Write for full details on any kind of diesel engine application—there's a Superior or Atlas Diesel for every power need.

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metric tons per month, as against 210,000 tons during the same period of 1952. magnesite was mined at the same rate as in 1952, the monthly average being 55,000 metric tons. During February 1953 the lead and zinc ore production reached 10,245 metric tons as compared with 9,844 metric tons during February 1952.

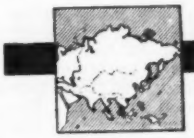
YUGOSLAVIA—Production is expected from the new aluminum plant at Strnisce in the spring of 1954. The electrolytic section is dependent upon the completion of the Vinodol power plant now under construction in the Drava Valley. During 1954, 4,600,000 Dinars are to be spent on Strnisce; 1,380,000 Dinars of this will be for imported material and machinery.

AUSTRIA—The *Panzendorf* pyrite mine has been closed down by the *Mitterberger Copper Mining Company* which had subsidized the mine since 1946. Cessation of operations was caused by the fact that Austrian cellulose factories preferred to import a higher grade of pyrite than that being produced at Panzendorf.

GREECE—A fourth supplementary technical assistance agreement has been signed by the government of Greece and the United Nations Technical Assistance Administration. Included in the agreement is provision for the services of an expert in geology who will undertake a preliminary six-week survey of the country. He will report on the possible development of a program in the field of geological map drafting, location and exploiting of underground water resources, and of metallic mineral resources. Further assistance in these fields is planned for 1954.

NORWAY—A new plant for handling iron ore at Narvik in northern Norway, now under construction, will be the biggest of its kind in the world, according to Karsten Dahlum, Norwegian manager of the Swedish iron concern *Luossavaara-Kiirunavaara A B*. The plant will move 8,000 tons of ore per hour. It will have a storage capacity of 4,000,000 tons of iron ore, will be entirely automatic, and will have four new ore crushers installed 70 feet underground. The ore will be carried by belts and 37-ton cranes mounted on a bridge 75 feet high and almost 3,000 feet long. Part of the installation will be ready next year, and the remainder in 1955.

FINLAND—Asbestos deposits have been found at Stansvik near Helsinki where iron, copper, and silver were mined 200 years ago. The *Finnish Mineral Company* is examining the area to determine whether the deposits can be commercially developed.



INDIA—The government has extended its control over substances which can be used for the production of atomic energy. The Atomic Energy Act of 1946 gives the Central Government the right to control development of industries connected with atomic energy. Specifically, these were uranium, thorium, plutonium, neptunium, beryllium, and their respective compounds. Now radium, graphite, zirconium, lithium, and deuterum are included in this group, and the Production and Use Order of 1953 further extends the government's control over certain minerals from

"Handiest piece of surface equipment we have at the mine"

Says A. J. Zinkl, Ass't. Mgr.

Iron King Mine and Mill near Humboldt, Arizona, property of the Shattuck Denn Mining Corp., is one of the most important lead-zinc producers in the west. To handle all kinds of construction and erection, they selected a 10-ton Lorain Self-Propelled crane, model SP-152. Here it is shown handling ½" steel sheets, size 4' x 12', used to build thickener tanks at the mill. But that is only one of many uses. Their Lorain handles mine timbers, unloads steel from cars, sets machinery, travels from one end of the extensive mine operation to the other to do 'most any job where lifting, loading, excavating, erection or material handling is involved. That's why A. J. Zinkl, Assistant Manager, says this rubber-tire "Jack-of-all-trades" is the handiest of all surface equipment at Iron King Mine.

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get these advantages from their Lorain Self-Propelled crane performance . . . to travel to mine or mill, to serve a wide area of their operation, to go places fast and to get to work in a hurry.

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- HANDLE MANY MATERIALS. You can fit your Lorain crane with more than 16 lifting attachments, to handle any size, shape or type of material.
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which, in the government's opinion, the prescribed substances can be obtained. No person or firm can now engage in mining or processing of these minerals without a license from the government.

BURMA—The government is conducting exploratory operations on a large zinc deposit at Lough Keng, southeast of Taunggyi in the Shan States of Upper Burma.

INDIA—In addition to coal, iron, and manganese, mercury will now be mined in Madhya Pradesh. Deposits of mercury ore have been discovered near Sakoil in Bhandara district, said to be the first instance of any mercury deposit ever located in India. The Indian government is sending a group of geologists to the area to carry out an elaborate survey.

BURMA—The Ministers of the Burma government are reported to have met with representatives of the Colombo Plan regarding the development of the mineral resources of the country. As this would require many technical men and trained miners, the government intends to send 100 men abroad at government expense for training in Australia, India, Colombo, Pakistan, and the Federated Malay States. An extensive survey of Pakistan's mineral wealth is currently underway as a part of the Colombo Plan.

INDIA—The Government of India has decided to permit the *Ooregaum Gold Mining Company* of India to close down its mine operations in the Kolar district. Its lease-share is to be transferred to the neighboring *Champion Reef Gold Mines India Ltd.* which may develop the residuary ore in the Ooregaum mine by an extension of its own workings, in accordance with a joint plan worked out by the two firms. Under the plan, Champion would offer continued employment to 980 of the 3,400 employees of the Ooregaum company. The committee which investigated the firm's request for closure of the mine, agreed that a serious and unavoidable decline in production, coupled with a steep fall in the price of gold made it no longer practicable for the company to continue its operations of the mine. An output of 3,200 ounces of gold per month were considered necessary to work the mine profitably; the present production rate is only 2,300 ounces and output is likely to decline to 1,900 ounces monthly during the second half of this year.

PAKISTAN—A new 12-month trade contract has been signed with Japan. Pakistan will send cotton, jute, hides, and skins, and will receive in return iron, steel, metals, textiles and capital goods.

INDIA—The *Central Provinces Manganese Ore Company, Ltd.* is mechanizing its *South Tirodi* mines. Preparations are also under way to mechanize their other mines, especially at *Dongri Buzurg* and *Mansar*. At Dongri Buzurg, a heavy-media separation plant is being installed to extract manganese ore from material that had not been considered suitable for extraction by hand-cleaning methods. The new plant will have a capacity of 75 tons per hour, and is expected to produce half of this quantity of manganese concentrate per hour. Operations may start by the end of this year. The *Kandri*, *Mansar*, and *Gumgaon* mines are now on the power grid and it is likely that the firm will now introduce more mechanization methods in its mine operations. The grid is to be extended to the Balaghat group of mines as well.

JAPAN—The *National Bulk Carriers, Inc.*, United States ship designers and builders, have contracted with the Japanese government to build three 60,000-ton ore carriers in Japan. They reportedly will be the largest freight vessels in the world. Each will have an overall length of 736 feet, and may be in operation by the beginning of 1955.

INDIA—The Rajasthan mica industry has been adversely affected by the fall in prices of certain grades, and several firms have already closed down. Exports, both in value and in quantity, were on the increase until 1951-1952; there was a decline in 1952-1953, and buying orders from abroad are fewer this year than last. In addition, the export now is predominantly of higher grades, while lower grades which constitute about 80 percent of the total production have fallen appreciably. One of the major factors said to be responsible for this situation is the policy of permitting exports of scrap and dust mica which are purchased by foreign countries at nominal prices and used to make synthetic mica. The Union Minister for Industries is urging the establishment of a Mica Marketing Control Board which is expected to curb unfair market practices and deliberate maneuvering to lower prices.

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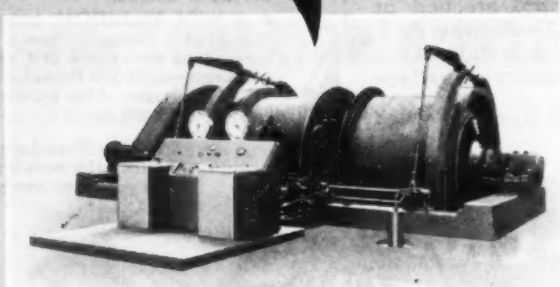
sizes up to 1500 H.P.



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Rope Pull 35,000/20,000 Lbs. Rope Speed 1,125 F.P.M.
96" Diameter x 66" Face Drums. Two 300 H.P. Motors.

Oil operated, gravity acting Post Brakes, torsion spring applied.
Oil operated, radial acting, multiple tooth Dental Clutches.
Console mounted Dial Depth Indicators.

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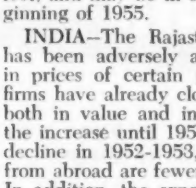
OCEANIA



PHILIPPINE ISLANDS—A contract for the delivery of 15,000 tons of manganese ore has recently been signed by *General Base Metals, Inc.* with *Fuji Shioji Kaisha, Ltd.* of Japan. This is the

largest ore commitment made by the company since its organization in 1949. Production has been stepped up at the mines, and current production is now about 8,000 tons per month. A group of four engineers are studying the possibility of opening the company's pyrite mines in San Jose, Antique, which have been laying idle because of a government ban on the exportation of sulphur-bearing ores.

TASMANIA—*Renison Associated Tin Mines N.L.* will amalgamate with *Pine Hill Tin Mining Co.* which it already partly owns. Dr. C. Loftus Hills has an option of sale over the two properties for United States interests. The orebody at Renison Bell is very large and of low grade. In 44 weeks to May 28, 10,332 tons were treated for 71 tons of concentrates. Output has since increased and in four weeks to May 28, 1,078 tons of ore were treated for 8 tons of concentrate. The Tasmanian Mines Department is assisting in solving metallurgical problems by experimental work in the department's laboratories.

INDONESIA—*N.V. Billiton Maatschappij* reports that last year Indonesia regained second place standing among the tin producing countries of the world. Tin output increased by about 4,000 tons to 35,000 tons in 1952, and Indonesia's share in world production increased from 18.8 percent in 1951 to 20.5 percent in 1952.

WESTERN AUSTRALIA—*Blue Spec Mining Co. N.L.* of Nullargine has taken an option of leases held by *Tantalite Ltd.* in the Pilbara field. The deposit contains tantalite, beryl, columbite, and caesium. Blue Spec holds the *Wodinga* mine, described by Dr. H. G. Raggatt of the Department of Supply as "the world's major producer of consistently high-grade tantalite." During the war, ores from the mines of Tantalite Ltd. were flown to the United States. It is said that the Pilbara field is the only one in the world big enough to permit operations on a scale sufficient for the needs of the *Fansteel Metallurgical Corporation* in the United States which reportedly will buy tantalite for two years or until 15,000,000 pounds have been received.

PHILIPPINE ISLANDS — *Paracale Gumaus*, which has been rehabilitating its property since 1951, reports that pumping is down below the 350 level. The 350 level pumping station has been completed and will be in operation soon. All pre-war pumps and other equipment located on this level are being brought to the surface for reconditioning. Ventilating air will soon be available in the tunnels on this level enabling inspection of the stopes and ore bodies in that area.

SOUTH AUSTRALIA—Full-scale commercial uranium production from ore mined in the state is planned for next year. Plants now operating have shown that the project is economically feasible. Treatment plants now being built at Radium Hill, where ore is mined, and at Port Pirie will refine all of the ore produced. Initially, South Australia will benefit from the sale of its uranium products in Great Britain and the United States, but ultimately the uranium will be used to generate electricity, and for defense and other requirements inside the country. An advisory committee on uranium mining has been appointed to assist the Australian Atomic Energy Commission. Two South Australian scientists have left Adelaide on an official mission to Transvaal (South Africa) where they will inspect uranium works. Later, they

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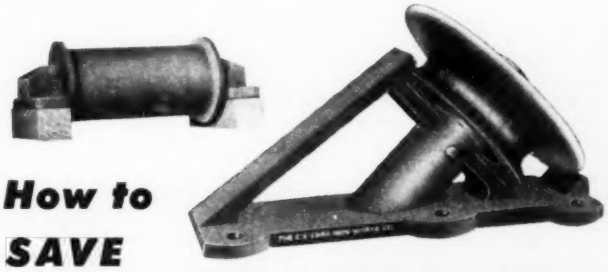

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Removing a four-foot core from the corebarrel of a Sprague & Henwood contract drilling rig at an iron ore property in Northern New York.

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will go to the United States for a period. At Port Pirie, a large housing program will begin soon to provide homes for technical and other workers who will be employed at the South Australian government's uranium treatment works.

NEW GUINEA—Exploration with Geiger counters is taking place in the central highlands near Warbag.

PHILIPPINE ISLANDS — Although *United Paracale Mining Company* closed down its mill in April because of losses from high costs and the caving of half of the mine, Pesos 50,000 worth of gold was recovered in May. This was in the form of three gold bricks which general superintendent Roscoe Cannon recovered from an old shaft where he had thrown it when the Japanese invaded the area in 1942.

NEW ZEALAND—*Grey River Dredging Co. Ltd.* reports net profit earned of £N.Z. 36,850 in the year ended December 31.

NEW GUINEA—*Guinea Gold N.L.*, which has an interest in *Bulolo Gold Dredging Ltd.*, earned £16,899 for the year ended February 28.

PHILIPPINE ISLANDS—Fred E. Bezotte, long-time diamond driller in the islands, will drill 60,000 feet of holes for the *National Power Corporation* at Ambuklao in Mountain Province. Most of the holes will be for grouting. General contractor for the job is the *Guy F. Atkinson Company*.

VICTORIA—*Harrietville Tronoh Ltd.* in four weeks to June 3 dredged 235,900 cubic yards for a recovery of 652 ounces of gold. *Central Deborah Gold Mining Company N.L.* of Bendigo in six months to March 31 treated 5,686 tons of underground ore for a recovery of 2,379 ounces of gold. Pyrite production is at a rate of about 2,000 tons per year. At Costerfield. *South Costerfield Antimony and Gold Mining Co. N.L.* has been taken over by *Victorian Antimony Mines Ltd.*

PHILIPPINE ISLANDS — *Lepanto Consolidated Mining Company* reports that the gradually increasing content of pyritic minerals in its copper mill feed (primarily enargite, Cu_3AsS_4) was a continuing trend during 1952. This condition caused the lowering of concentrate grade to around 22 percent copper during June, July, and August. In early September, the situation became critical when, on several days, the grade fell below 20 percent copper and for the first 11 days averaged 20.6 percent. On the basis of extensive laboratory tests, a selective flotation mill test was begun in an effort to improve the previous bulk flotation results. Selective operations were established on September 15 and have continued ever since. The following is a comparison of results of the two types of operation on comparable mill feed: For the period September 1-11, 16.2 percent of the mill heads was produced as concentrate, assaying 20.6 percent copper and 0.700 ounces gold; plant recovery averaged 93.8 percent of contained copper and 79.2 percent of contained gold. For the period September 15-30, 11.3 percent of the mill heads was produced as concentrate, assaying 29.2 percent copper and 0.775 ounces gold; plant recovery averaged 92.0 percent of contained copper and 72.3 percent of contained gold. Although attempts at increasing the grade of concentrate have resulted in higher tailing assays, it is believed these losses will be more than offset by savings in handling and shipping costs.

(*Continued on page 79*)

"THIS LUBRICANT CUT OVERHAULS IN HALF"
—says WESTERN AUTO TRANSPORTS, INC.

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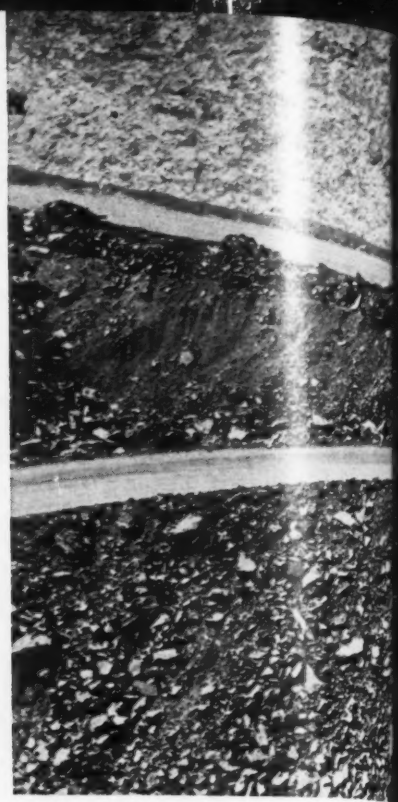

Giant 50-ton Tournarocker is loaded with 7 to 8 passes of 5-yd. shovel. Large bowl (13' x 17') makes easy shovel target, speeds loading. With 90° power steer and electric controls, Tournarockers get under shovel faster, position for dump faster than conventional haulers. Tournarockers can turn around in 15'8" radius.

Big "A" Tournarockers

CORREALE CONSTRUCTION CO., Hazleton, Pa. — contract-stripping for Philadelphia & Reading Coal & Iron Co. at Minersville — has a rugged hauling job on its hands. Overburden and coal from a 140' anthracite vein must be trucked 3000' to one mile up continuous 10 to 15% grades. Because haul road moves frequently with the excavation, it is of temporary construction. It

Rig dumps 40 tons of coal into cleaner plant hopper in 17 seconds. Simple fingertip electric controls operate dump, shift, steer. Big 4-wheel air brakes (9408 sq. in., total braking surface) stop rig on a dime . . . assure perfect safety on hills.

Tournarockers swing around in a tight U-turn at the pit and back into loading position, 1 on either side of the shovel. Note how prime-mover and body tilt independently (up to 30° oscillating pivot) to eliminate twisting and strain.

High-speed, rubber-tired hauling • lifting • excavatin

Loaded with 40 tons of coal, Tournarocker climbs .6 mile of 10% grade on haul to cleaner plant. Special extension lip built at rear of bowl keeps coal from spilling out on uphill haul, and increases coal-carrying capacity by about 10 tons.

lick tough stripping job

is rough, bumpy . . . has several hairpin curves, and crosses a main highway. From 2500 to 3750 tons of coal alone must be hauled up the road to the plant daily. Also, the overburden that covers an equivalent tonnage must be moved.

4 "A's" do work of 11 trucks

Under these conditions, Correale hauls both shot rock overburden when stripping, and coal on the loading operation, with 4 king-sized 50-ton A Tournarockers. Where coal is handled, load time for 40 tons averages 3⅓ minutes. Load time for 50 to 60 tons of straight overburden averages 5 minutes. For coal loads, cycle of 1.2 miles to and from the cleaner plant takes 18.8 minutes, despite the steep grades, sharp switchbacks, and U-turn made to back into hopper channel. For overburden, cycle of 2 miles to spoil bank takes about 20 minutes. With this steady, high-speed performance, Correale reports they move as much rock and coal with their *four* 450 hp Tournarockers as they formerly hauled with *eleven* 15 to 22-ton trucks!

For low-cost, heavy-duty hauling . . . on or off the road . . . you'll want to get all the facts on Tournarocker. Available in sizes from 9 to 50 tons. Ask your LeTourneau Distributor for owner-verified reports covering work like yours. No obligation, of course.

Interesting facts on Correale's job

Depth of anthracite vein	140'
Present depth of cut	270'
Eventual depth of cut	340'
Quantity of coal removed to date	4,000,000 tons
Estimated coal still unworked	1,000,000 tons
Length of haul from pit	
For coal	0.6 mile
For overburden	1.0 mile
Nature of haul	All uphill, 10 to 15% grades
Hourly plant output, coal (90% handled by Tournarockers)	200 tons*
Average daily plant output (14-hour day)	2500 tons*
Record daily plant output (14-hour day	3750 tons*

*NOTE: Weight of processed coal only. Does not include stockpiled coal, nor rock overburden delivered with coal and removed from conveyor belt before weighing. Overburden hauled direct to spoil bank also not included.

What Correale operators say:

John McCann . . . "Tournarockers have lots of guts. We pull heaped loads up these steep grades in 2nd gear (6½ mph) — have power to spare. Electric controls don't give us a bit of trouble."

Cletus Tobin . . . "Tournarockers are a lot easier to handle than other haulers. You don't have to fight a steering wheel all day — just use that 'fingertip control'. You can turn around on a dime."

Stephen Autalosky . . . "There's nothing like Tournarockers for this hauling. I wouldn't want to drive a truck anymore. Fingertip controls sure save a lot of work for us drivers."

Tournarocker—Trademark Reg. U.S. Pat. Off. AR-302-CM

equipment

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

With a double-drum hoist, the Pacific RTC Block guides Pacific Slushmaster Scraper in 90° turn. Photo courtesy of Bunker Hill and Sullivan Mining and Concentrating Co., Kellogg, Idaho.

Here's the *Right* turn

PACIFIC
Sheave Block
Model C Half Shroud

Send for Bulletin No. 238.

PACIFIC "ROUND-THE-CORNER" Sheave Block

For complete description with action pictures and operating instructions, send for Bulletin No. 232.

PACIFIC "SLUSHMASTER" SCRAPER
Model 2A 34"

Send for Bulletin No. 215.

Here you see a two-drum hoist pulling a fully loaded Pacific "Slushmaster" scraper around a 90° right turn with the help of a Pacific "Round-The-Corner" Sheave Block and a Pacific Half Shroud Sheave Block. With this Pacific Team, you can pull your scraper around any number of turns.

It's the "Right Turn" profit-wise, too. Operating experience shows that you can cut the cost of mucking out a square-set round in half! Be on the winning side. Pacific Teamwork is paying off for others and will do the same for you. Write today for complete information.

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BE SPECIFIC—ORDER PACIFIC
Jaw Crushers, Sheave Anchors, Bit Knockers and Pacific Wearing Parts

(Continued from page 74)

SOUTH AUSTRALIA — *Hopetoun Mines N.L.*, which has been inactive for a number of years, has taken an option for 12 months over *Pauls Consolidated Copper Mines*, 1½ miles north of Burr Well Head station. Half of the cost of diamond drilling will be borne by the Mines Department. The lode is of stringers and pods in a mineralized zone up to 18 feet wide and is described by the Mines Department as "one of the more attractive of the many north of the Flinders Ranges."

LIBERIA—A 10,000-ton shipment of iron ore from the *Bomi Hill* deposit operated by the *Liberian Mining Company, Ltd.* was sent to the *Timken Roller Bearing Company* in Canton, Ohio. The high-grade shipment, containing 67 percent iron, represents one year's ore supply for Timken.

UNION OF SOUTH AFRICA—A new firm, *Letaba Copper and Zinc Corporation, Ltd.*, has been formed to mine the *Letaba* copper and zinc property, where prospecting, shaft sinking, and development have been in progress for some time. The property lies to the east of the *Consolidated Murchison (Transvaal) Goldfield and Development Co. Ltd.* property in the northeastern Transvaal. The *Murchison Copper and Zinc Holdings Ltd.* and *Trans-Rhodes Finance and Mining Co. Ltd.* are shareholders in the venture, along with the *Middle Witwatersrand (Western Areas) Ltd.* with which *American Anglo-Transvaal Investment Corporation Ltd.* has now been amalgamated.

FRENCH EQUATORIAL AFRICA—*Compagnie Miniere de L'Ogooue*, formed by French and United States interests, will have six members of the *United States Steel Company* on its board of directors and six representatives of the French interests. U. S. Steel now supplies 49 percent of the capital for the project, while the *French Overseas Mining Office* supplies 22 percent, *Mokata Hadid* 14 percent, and *Compagnie Miniere de L'Oubangui Oriental* 14 percent.

ALGERIA—Geologists in the Mining Exploration Office are reported to have discovered an iron ore deposit near Tindouf, with reserves estimated as high as 600,000,000 tons. Open-pit mining was recommended for the project because the deposit is said to be close to the surface. At present, experts are investigating the water supply in the area.

UGANDA—The huge dam being built at Owen Falls at Jinja will be completed in 1954. The cheap power which the operation will be able to provide is expected to have a tremendous effect upon the industrialization of the country. Plants may be erected to refine copper, cobalt, iron ore, and other minerals said to be in abundance in Uganda, while smelting plants are already under construction at Lake Victoria a few miles from the dam.

UNION OF SOUTH AFRICA—The world's largest gold producer, *Blyvooruitzicht Gold Mining Company Ltd.*, has been officially added to the list of uranium producers in South Africa with the opening of its uranium plant at the mine. Like the other gold producers, Blyvooruitzicht will recover byproduct uranium from gold residues.

SOUTHERN RHODESIA—After being closed for 23 years, the *Baddeley* copper mine near Headlands, between Salisbury and Umtali, is being reopened. The new firm also has mineral rights on two nearby prospects, the *Dora* and the *Makooi*. Assays show values up to 35 percent copper, with an average of about 6 percent. This is said to compare with 16 percent and 3 percent, respectively, in the copperbelt of Northern Rhodesia.

SOUTH WEST AFRICA—*Uis Tin Mining Company (South West Africa) Ltd.'s* new concentrating plant should be in operation by the time this goes to press. Erection of the steel structure and installation of machinery in the concentrator section of the plant had been proceeding on schedule and special equipment from the United States for the extraction of tantalite-columbite from tin was expected by the end of the second quarter. With the new plant in full operation, the company expects to mine and treat 1,000 tons of ore per day. For the quarter ended April 30, production amounted to 18,583 kilograms of tin concentrate (18.3 long tons) valued at £10,000. The ore was crushed in the crushing section of the new plant and concentrated in the pilot plant which had a limited capacity.

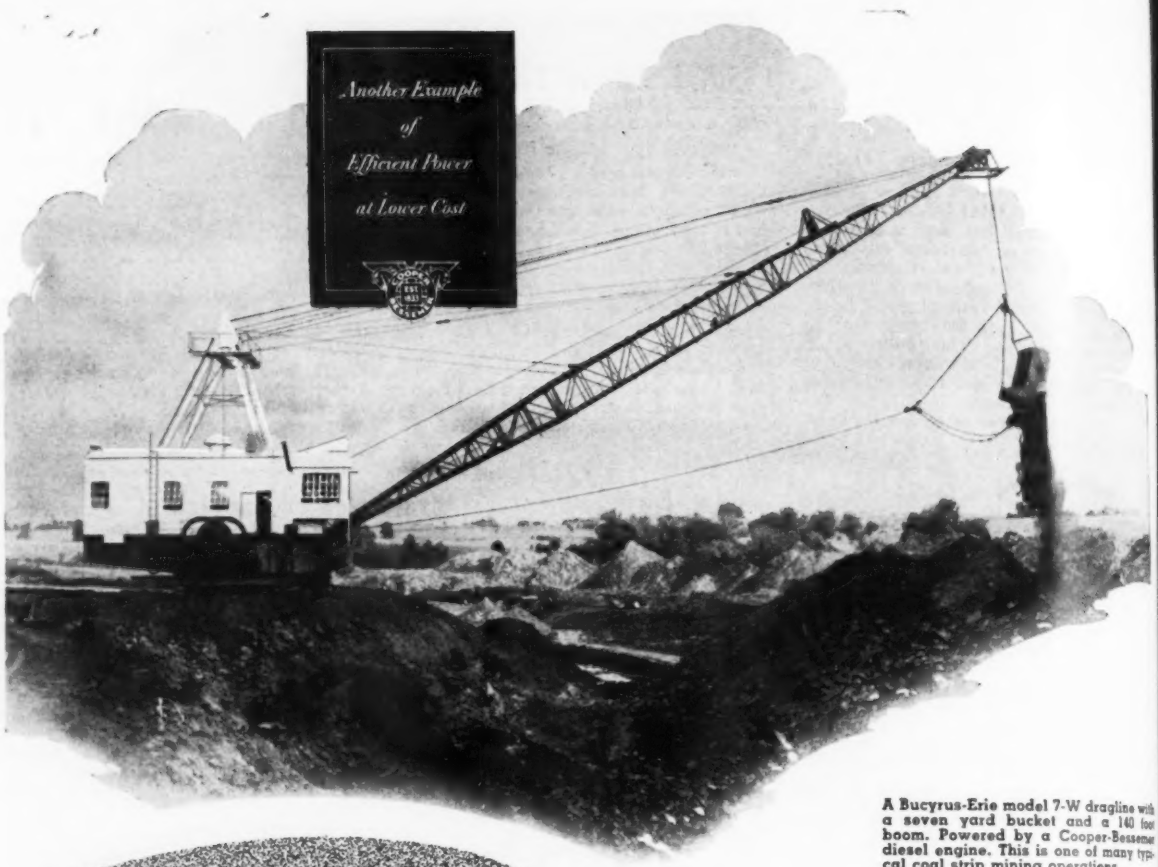
UNION OF SOUTH AFRICA—A new plant to process blue and other asbestos fibers has been built near Pietersburg by the *International Asbestos and Mineral Corporation Ltd.* The plant incorporates the *Marchioli* mill which has proved so successful in Italy in producing a fiber in an undamaged state. International Asbestos has tried the method in a pilot plant, and it now remains to be seen whether the same results can be obtained in full-scale operation.

LIBYA—Under the provisions of a new minerals law governing the exploration and development of minerals in Libya, all minerals in Libyan territory are the property of the state. No one may explore, extract, exploit, or acquire minerals in Libya except by permit or by a monopoly granted in accordance with the procedure established by the new law. Applications for mineral exploration must be submitted to the Federal Minister of Finance and Economics; after his approval, the applications are referred to the Governor of the Province where the permits are prepared and fees determined. Further approval is required by the Council of Ministers. No license or monopoly will be granted except under regulations formulated or approved by the Minister of Finance and ratified by the Libyan Parliament.

SOUTHERN RHODESIA—The *Queens Prize* mine has ceased gold production until mining conditions become more fa-

DAGGAFONTEIN URANIUM PLANT OPENS

The official opening of the Daggafontein Mines, Limited's uranium leach and sulphuric acid plants was the first stage in a program that will ultimately cover seven mines of the Anglo American Corporation of South Africa, Ltd. in the Transvaal and Orange Free State making the Anglo American group the largest uranium producer in the country. Mines in this group (besides Daggafontein) are operated by Western Reefs Exploration and Development Co., Ltd., Free State Geduld Mines Ltd., President Brand Gold Mining Company, Ltd., President Steyn Gold Mining Company, Ltd., Welkom Gold Mining Company, Ltd., and Western Holdings, Ltd. Daggafontein, the second largest gold producer in the Union, has several sources from which uranium and pyrite can be drawn. The principal of these is the Kimberley Reef; others are the old tailings in the Kimberley Reef reduction plant slimes dam and concentrates from the Main Reef Leader reduction plant. In the flotation section of the latter plant, current slimes, as well as old tailings from the slimes dam, are treated in Agitair cells to give a concentrate of uranium, pyrite, and gold. The old tailings from the slimes dams at both reduction plants are recovered through sluicing by means of high-pressure hydraulic jets. Shown in the photograph above is the uranium plant itself, taken from the No. 4 shaft headframe. The uranium leach and sulphuric acid plants are reported to be four times larger than the units of West Rand Consolidated Mines, Ltd., and are among the largest planned.



A Bucyrus-Erie model 7-W dragline with a seven yard bucket and a 140 foot boom. Powered by a Cooper-Bessemer diesel engine. This is one of many typical coal strip mining operations.

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Because Cooper-Bessemer diesels excel in flexibility, in fast response and smooth behavior at any load, they're preferred power on the biggest, toughest dragline jobs. It's the result of new, often exclusive features built into heavy duty diesels by one of the nation's oldest engine builders.

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verable. It is reported that small gold mines in the country are closing down with "monotonous regularity" these days.

UNION OF SOUTH AFRICA—*Government Gold Mining Areas (Modderfontein) Consolidated Ltd.* is building a plant for the recovery of pyrite on its property in the Transvaal district. Operation is expected early in 1954. The company is paying for about one-third of the plant's cost, and the remaining financial assistance will come from loans arranged through the British and United States authorities. Arrangements have been made for a portion of the plant's output to be made available to various producers of acid for use in uranium treatment plants.

NORTHERN RHODESIA—*Rhodesia Broken Hill Development Co. Ltd.* states in its annual report that at the time of flooding of the lower levels of the mine in April 1952 (caused by exceptionally heavy rains), the mine pumps were at one time handling nearly 26,000,000 gallons of water daily. In order to prevent a recurrence of the trouble as much as possible, an additional control crosscut was excavated on the 1,050 level off the Davies shaft. A panel of 20 drainage boreholes was drilled to the water-bearing fissure to enable water to be passed to the pumps more rapidly during periods of heavy rainfall. Additional pump capacity is also being installed and more effective canalization of surface water is being provided.

UNION OF SOUTH AFRICA—*De Beers Consolidated Mines Ltd.* reports that production in 1952 declined to 786,354 metric carats from the 1951 total of 817,058 carats. Mining and washing operations continued throughout 1952 at *Wesselton* and *Jagersfontein* mines and the alluvial deposits at Kleinzee. *Dutoitspan* mine operations were suspended in November, while *Bultfontein* mine was reopened in December. In addition, a substantial production was obtained from treating old dumps. Total loads washed amounted to 6,674,640, a decrease of 441,114 over the previous year. At the washing plant, a second unit was installed and brought into operation. The new recovery plant has been completed and all concentrate from the washing plant is now further concentrated in a small heavy media separation plant. The tailing is disposed of by belt conveyor. The pulsator is now being used to retreat concentrate from old dumps.

FRENCH WEST AFRICA—The 1953 to 1957 French investment program for mining development in Mauritania provides for an allocation of £26,000,000, 50 times more than that provided in the previous five-year plan. The increase came through recognition of the tremendous copper and iron resources in the country. *MIFERMA—Societe des Mines de Fer de Mauritanie*—expects to produce 4,000,000 tons per annum from the iron mines at Fort Gourand; the *Societe des Mines de Cuivre de Mauritanie* expects to produce 20,000 tons of copper per year from the *Akjoujt* mines which it controls. (See MINING WORLD, January 1953, p. 59.)

NORTHERN RHODESIA—*Mufulira Copper Mines Ltd.* and *Roan Antelope Copper Mines, Ltd.* are reported to have asked the Northern Rhodesian Copper Miners Union to consider the admission of natives so that they may be entitled to hold more responsible jobs, now held exclusively by union members. This is said to be the first time that the color issue has been openly challenged by management. The two concerns employ about 20,000 natives and 2,800 white workers.

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WITH *Stearns*

SUSPENDED MAGNETS

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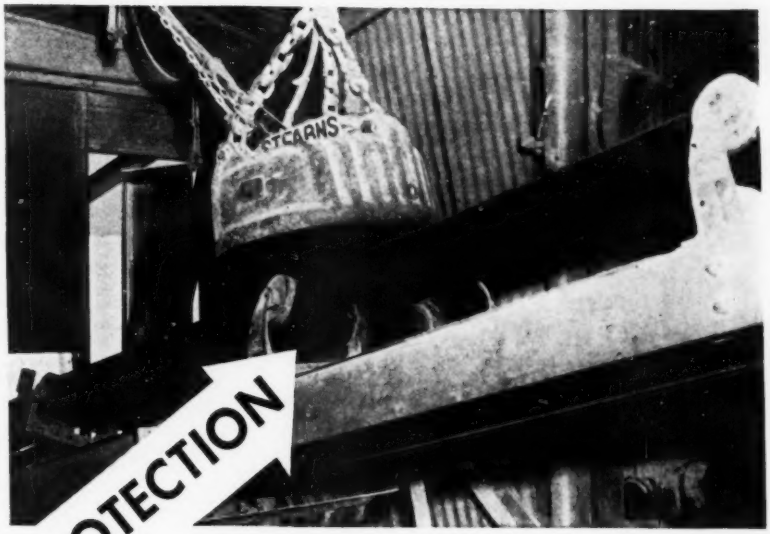

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Here's the economical way to protect crushers, grinders, pulverizers and other vital equipment — use a STEARNS Suspended Magnet over your conveyor belt or head pulley. This STEARNS Circular Suspended Magnet is one of two installed at the National Gypsum plant at Savannah, Ga., to remove all tramp iron before the rock enters the crushers.

You can protect your machinery and purify your product the low cost, positive way. Eliminate all tramp iron with STEARNS Suspended Magnets — this means fewer repair bills on crushing equipment, fewer shutdowns and higher production.

Whether you are handling rock, slag, coal or ore, investigate STEARNS Suspended Magnets; they're easy to install and have low operating and maintenance costs. Write today for descriptive literature on both circular and rectangular suspended magnets.

Complete laboratory and testing facilities available for separation tests on your materials.

STEARNS Circular Suspended Magnet for inclined installation over head pulley.

Rectangular Suspended Magnets available in sizes and shapes to meet your requirements.

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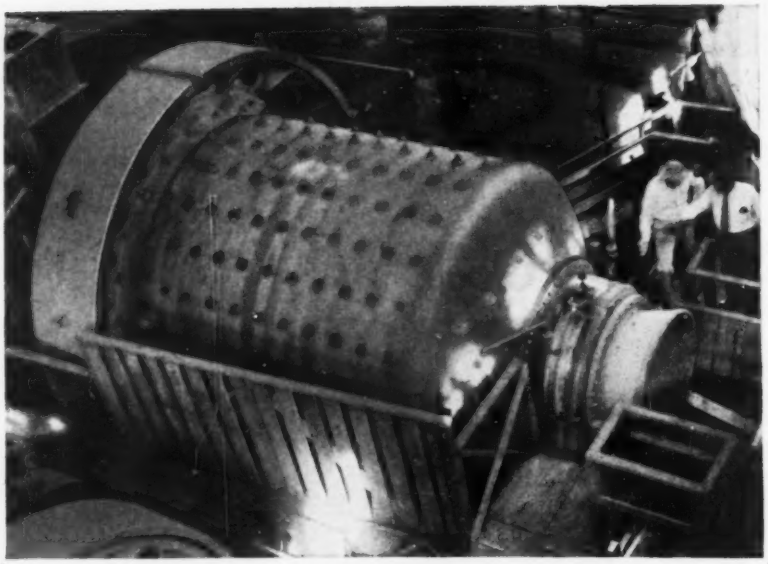

world's largest rod mill is a

HARDINGE

rod mill

WITH CONVEX HEADS

The 11½′ x 12′ Hardinge Rod Mill shown above at Consolidated Mining and Smelting Company's Chapman Camp concentrator in British Columbia is the world's largest rod mill. It is doing an outstanding job.

Capacity: 8500 tons per day
Liner Consumption: .168 lbs. per ton of feed.
Rod Consumption: 0.354 lbs. per ton of feed.
Horsepower: 930

The convex feed head allows a free fall of the ore into the rod mass. The convex discharge head expedites removal of broken rods. Convex heads also prevent excessive head liner wear. Write for Bulletin 25-C-3.

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UNION OF SOUTH AFRICA—*President Brand Gold Mining Company, Ltd.* hopes to have its new production plant ready for metallurgical and interest purposes early in 1954, with production to start shortly thereafter. The capacity of the plant will be increased from 75,000 tons monthly to 125,000 tons, and in order to avoid any delay the material required for this extension has already been ordered. Shaft No. 1 has been completed to its final depth of 4,879 feet and underground development has started toward the reef on four separate levels. No. 2 shaft had reached a depth of 4,468 feet by the end of March. It will be stopped at 4,84- feet, and at a later date a sub-vertical shaft will be sunk from the 4,600 level to open up the reef in the southern portion of the mine. The connection between shafts on the 4,600 level will be completed about the middle of 1954.

NORTH AMERICA

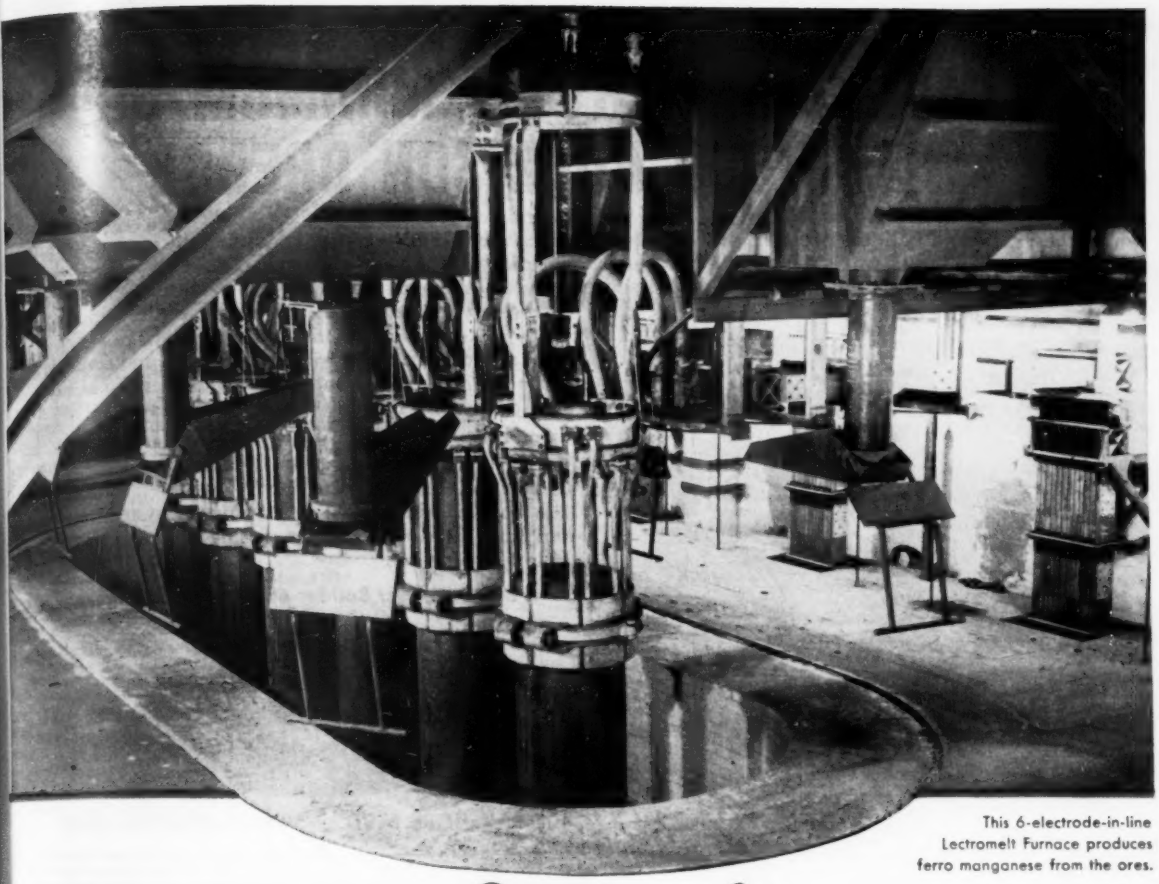
ONTARIO—The *Canadian Johns-Manville Corporation* has purchased a newly discovered asbestos deposit in Reeves Township, in the same general area as the company's *Munro* mine and mill. The property was acquired through the extensive exploration program Johns-Manville has been conducting since the end of World War II. No plans have been made for establishing production facilities at the site, since the firm believes that ample asbestos production facilities already exist in Canada and in other areas of the free world.

ALASKA—Among the mining operations under way in the 1953 season are those of Fred and Art Purday in the Chicken Creek area, the George Turner in the Fortymile district, Hugh Matheson in the Ophir district, and Mr. and Mrs. Ellsworth Whitaker who will prospect for uranium about 75 miles northwest of Bettles.

BRITISH COLUMBIA — *Western Mines, Ltd.* has started new work at its *Ainsworth* property in the hope of developing sufficient ore to increase the capacity of its 100-ton concentrator to about 300 tons per day. Because of low base metal prices, mining operations were suspended December 15. A limited amount of drilling is planned in the *Kootenay Florence* mine, while an intensive exploration program is planned for the *Lakeshore* mine. Surface geologizing will be followed by trenching on the Lakeshore, and a number of diamond drill holes will test the ground on both the strike and downward extension of the present orebody.

MANITOBA—*Sand River Gold Mining Company* is currently drilling at its newly acquired nickel-copper-zinc prospect in the Knight Lake area of northern Manitoba. The company has staked 19 of the claims and holds 33 under option. Preliminary prospecting uncovered a number of sulphide zones, two of which show nickel-copper-zinc values.

QUEBEC—The geophysical and electrical survey being made at the property of *Quebec Nickel Corporation Ltd.* adjoining *Eastern Metals Corporation Ltd.* in Rolette Township has been completed, diamond drilling will get underway im-



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Provide more uniform heat distribution and production. You can maintain almost any desired heat condition with minimum downtime.

You'll get maximum electrical efficiency . . . resulting in low power consumption per ton and high power factor.

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1. Electrodes equidistant from refractories at 14 places, instead of three places as in a circular furnace . . . avoid super-heated zones, make heat distribution uniform.

2. Three-phase power arrangement allows each pair of electrodes to operate at independent voltage settings, giving greater flexibility; permitting temperature increases, for example, of a viscous slag near the taphole before making a tap.

3. You can space electrodes for best operation by sliding electrode gear longitudinally . . . without shutting down furnace.

4. Furnace charge protects sidewalls, adds life to carbon or refractories.

5. Furnace is oblong; requires less space . . . it's mechanically easier to charge.

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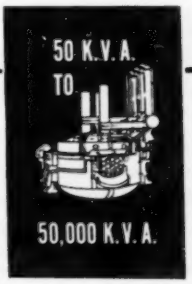

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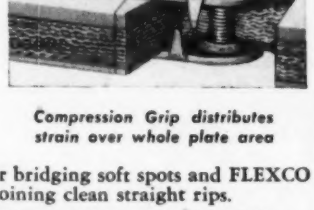

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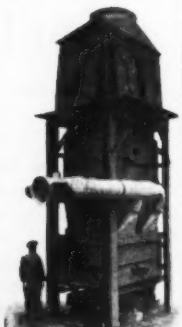

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mediately following correlation of the geophysical results. At Rex Lake, diamond drilling of a new copper discovery is systematically testing along strike of the zone at 200-foot intervals. At Gordon Lake, seven miles west of Rex Lake, two diamond drills are in operation. One is drilling from the island to fill in an unexplored gap and to test the ore to greater depth. A second drill, operating on the west shore, is extending the ore zone to the west.

ARIZONA—*Verde Exploration, Ltd.* has negotiated a contract with *New Jersey Zinc Company* for further exploration of Verde's properties near Jerome, Arizona. New Jersey plans to spend a preliminary $50,000 in 1953 for exploratory drilling; to finance cash requirements of at least $10,000 for certain options, leases, and land purchase agreements; and to underwrite Verde's operating expenses up to $16,000 per year. New Jersey may withdraw at any time after expenditure of the first $50,000, or it may continue further exploration at its own expense for three years. In return, Verde will give New Jersey Zinc an option on all properties to be exercisable by a company which New Jersey Zinc and Verde will form.

BRITISH COLUMBIA—In its annual report for the year ended March 31, 1953, *Pioneer Gold Mines of B.C. Limited* says that mine production was increased, and that work on the No. 5 shaft, the ventilation raise, and several pressing surface plant construction projects were rushed as rapidly as possible. Exploration was continued on a limited scale with most of the expenses shared by *New York-Alaska Gold Dredging Corporation*. Total gold produced was 41,886,786 fine ounces, compared with 39,511,758 fine ounces in 1951-52. The future of the operation depends upon the time factor between the exhaustion of ore reserves above the 25 level and the bringing into production of the levels below the 25th. Every effort is being made to complete the sinking of the No. 5 shaft and to bring lower levels into production in the shortest possible time.

NORTHWEST TERRITORIES—*Gui-Por Uranium Mines & Metals Ltd.*, reporting on first results of its drilling program now underway on its 600-acre *Beaverlodge* property adjoining the *Goldfield Uranium Mines Ltd.*, advises that four holes have been drilled to date along a strike length of 400 feet. Current drilling is exploring the structure in the vicinity of the No. 97 showing associated with the north-east south-west striking Spot Lake Fault in the north-central part of the property where past trenching work exposed a 60-foot zone length, assaying as high as 0.62 percent U_3O_8. Drilling is now under way between Holes 3 and 4 and 3 and 5.

SASKATCHEWAN—*Radiore Uranium Mines* has started diamond drilling on its property in the Rages Lake district of northern Saskatchewan, while *Homer Yellowknife Mines* has acquired two additional claims in the St. Mary's Channel area. Also in the St. Mary's area, *Gunnar Gold Mines* has completed eight additional diamond drill holes which extend the ore body a distance of 640 feet in a north-south direction and for 300 feet in an east-west direction. Holes are all at 75-foot intervals. In the Lake Athabaska area, *Baska Uranium Mines* has put down a series of short drill holes on its *Walberg* property.

MONTANA—*Amador Mining Company* of Superior will purchase the long-term lease of the *Kootenay Copper Mines, Inc.* on the *Green Mountain* mine near Dixon. Purchase price of the lease, including machinery and equipment, will be $100,000 payable by means of royalty and a share of the gross profits of the operation.

ALASKA—The United States Geological Survey's topographic mapping parties have started initial operations in the 1953 Alaskan mapping program. Work is scheduled in two areas: one covering about 17,000 square miles in the Kantishna River, Melozitna, Tanana, Fairbanks, Healy, and Mt. McKinlev areas; the other covering about 68 additional "inch-to-the-mile" quadrangles in the Seward, Kenai, Tyonek, Blying Sound, and Seldovia areas. Released by the Geological Survey is a preliminary report on the geology of the Nelchina area, and maps showing Crescent Lake and Ptarmigan Lake on the Kenai Peninsula near Seward. The latter, based on surveys made during the 1951 season, furnish basic data for evaluation of the water-power potentialities of the lakes and for classification of public lands in order to develop water-power values.

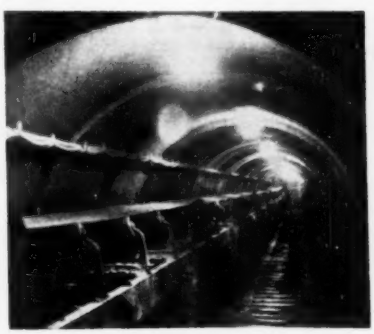
ONTARIO—A new 300-ton-per-day concentrator is being tuned up for production at the property of *Nickel Offsets Ltd.* on the north rim of the Sudbury Basin. First shipments will go to *Falconbridge Nickel Mines Ltd.* for treatment. A contract calls for delivery of at least 10,000,000 pounds of recoverable nickel over a four-year period, terminating September 30, 1957 or earlier if the contract is fulfilled. Initial production will come from the No. 1 or west shaft, and the No. 2 or east shaft, located about 3,000 feet apart. Mining will be carried on from both openings, with the No. 1 providing the main source of mill feed. The surge bins, crusher, and concentrator are located at this shaft site. All underground work for the present is being concentrated on stope preparation and nothing reportedly is being done on the three new levels at the No. 1 shaft where the 1,250-foot, 1,400-foot, and 1,550-foot levels were established about two years ago.

BRITISH COLUMBIA—An extensive program of exploration-development preparatory to the start of actual development is now being resumed by *Rexspar Uranium & Metal Mining Co. Ltd.* at its uranium property in south-central British Columbia. Immediate work for the 1953 season calls for approximately 5,000 feet of exploratory drilling between the "A" and "BD" zones. Two drills will prospect the 1,600 feet of ground between the two zones.

ARIZONA—*Copper Creek Consolidated Mining Company* of Tucson has been awarded a copper production contract by the U. S. Defense Materials Procurement Agency calling for 5,500,000 pounds of copper which the government will buy for 29 cents per pound f.o.b. Midwest points. Copper Creek will spend about $150,000 in preparing its ore body and building a precipitation plant. Production may start within six to eight months; expiration date for the guaranteed price is June 30, 1956.

ALASKA—The *United States Smelting Refining and Mining Company* has six dredges operating in the Fairbanks area this season. Only three will operate at Nome. A fourth dredge capsized early in May and is partially submerged. (See MINING WORLD, July 1953, p. 69). The dredge pond is being pumped out to determine the cause of the accident and the extent of the damage.

SASKATCHEWAN—*Western Potash Corporation's* shaft has reached 160 feet



MORE ON BARVUE'S CONVEYORWAY TUBES

In response to an evident reader interest, we publish these two additional views of the tubular conveyorways installed by Barvue Mines Ltd. at Barraute, Quebec. The development of the property and the building of the mill were described in the March 1953 issue, pages 40 to 45. The conveyorways, fabricated as self-supporting pipes from ¼-inch steel plate, take advantage of steel's best quality—high tensional strength. They also take advantage of the inherent strength of the tubular shape. Besides their strength, the tubular conveyorways have a neat and pleasing appearance that is commented upon by many who see them. The outside of the tube is shown above at the left. This tower stand, similar to a power-pole stand, supports the tubular conveyorway leading to Barvue's main mill building. Expansion can be allowed for by means of a sliding bracket at the tower. The inside of the conveyorway is shown in the photograph at the right (taken by William Shank of the Hardinge Company). There is ample room for access and repair, and the tube lends itself to neat arrangement.

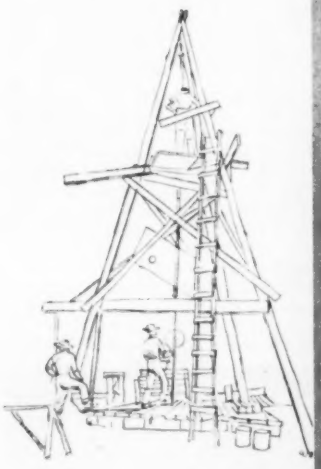
in its goal of 3,475 feet. Now that the initial difficulties of sinking through quicksand have been overcome, progress is expected to be at the rate of 200 to 250 feet per month. At this rate, it will take about 16 to 18 months for completion. Once the potash bed is reached, the company expects to carry out development and mining by horizontal brining methods. Two 12-inch pipes are being sunk with the shaft. One will carry water down, while the other will return the brine solution when mining operations have started. The project is located about nine miles northwest of Unity.

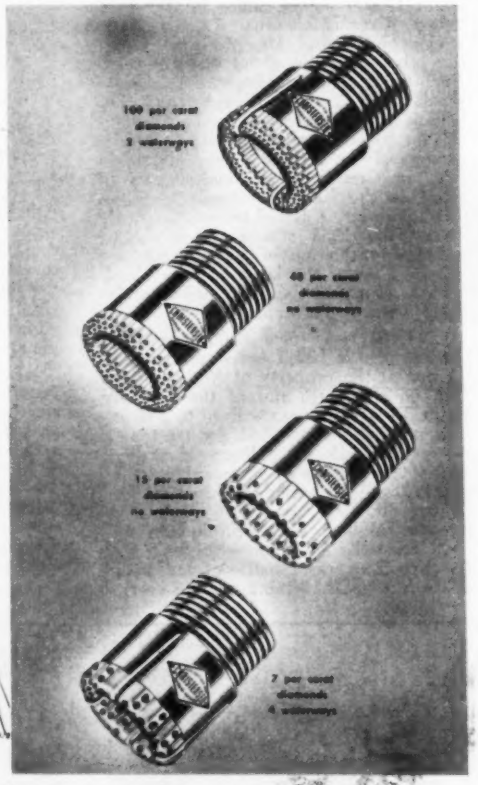
NORTHWEST TERRITORIES—*Rossland Mining Company Ltd.* (formerly *Rossland Mines, Ltd.*) reportedly has acquired an option to purchase 12 uranium claims in the Nonacho region about 100 miles north of Beaverlodge Lake. The claims were originally staked by Einar Larum. Diamond drilling and surface exploration are underway. At the company's *Rossland* property in British Columbia, a winze has been sunk on the dip of the vein at a 77° angle to a depth of 147 feet below the No. 2 level. A level will be developed at this horizon and an even lower level may also be established.

SASKATCHEWAN—*Grand Chibougamau Mines Ltd.* has started exploration work on its 2,700-acre property on Foster Lake. The program is under the direction of *Technical Mine Consultants Limited*, who have laid out an initial program of general prospecting, mapping, and Geiger survey work. The Foster Lake property lies on strike to the southeast of the *Eldorado Mining and Refining* [illegible] Limited pitchblende-cobalt ground.

QUEBEC—Progress is on schedule at the *Gaspe Copper Mines* [illegible] project in which *Noranda Mines Ltd.* owns a 95 percent interest. Detailed diamond drilling and some ore intersections by underground openings have confirmed previous estimates of tonnage and grade of ore. A model townsite is under development and 120 housing units have already been erected. It is expected that hydroelectric power will be available in the fall of 1954, when mill production will commence, to be followed by smelter production early in 1955.

SASKATCHEWAN—Initial exploration work on the recently acquired Foster Lake acreage of *Clix Athabasca Uranium Mines Ltd.* has started. This will soon be followed by field activity on the Beaverlodge-St. Mary's Channel area property of the firm to the south of Beaverlodge Lake. Work at Foster Lake will consist of general prospecting, mapping, and a Geiger survey, while the Beaverlodge property will have a surface exploration and diamond drill program.




100 per carat diamonds 3 waterways
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LATIN AMERICA

CUBA—Francisco Videl is operating the *Dora* mine in the Matahumbre district of the island. He has moved a 600-foot compressor in and has started cleaning out old workings. The Dora mine once had a complete plant in production.

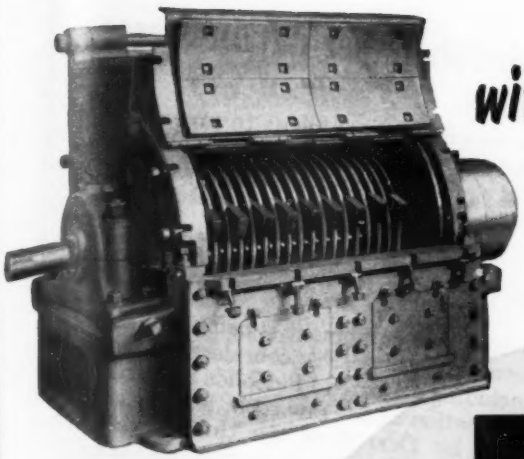
BRITISH GUIANA—A deposit containing approximately 46,000,000 tons of iron ore has been reported in the Blue Mountains near the Essequebo River. A mining company plans to explore the property further.

BOLIVIA—*Patino Mines and Enterprises Consolidated, Inc.* reports that 8,514 long tons of fine tin-in-concentrates were produced from January to October of last year. The period covered is only up to October 31, because, following that the properties became subject to the Bolivian government's nationalization decree. Estimated tin content of the reserves as of October 31, 1952 was 147,235 tons. Broken down, this was 24,819 tons in mines; 33,960 tons in old fills; 68,558 tons in block caving areas; and 19,918 tons in mine dumps. These figures do not represent the total potentialities of ore in the mines, according to the report.

MEXICO—The *American Smelting and Refining Company* has decided to suspend operations at its *Dolores* silver mine at Angangueo, Michoacan, where an underground explosion and fire in April killed 30 miners and injured 40 others. Fires are continuing on the lower levels and exploration crews have been imperiled by poisonous gas. Closure of the mine brings a loss of about $40,400 per month, but operations will be transferred to the nearby *Descubridora* mine which was a good silver and zinc producer.

BOLIVIA—The *Patino Mines and Enterprises Consolidated's* formula for compensation for the tin holdings nationalized by the Bolivian government have been accepted by the *Bolivian Mining Corporation*. The agreement calls for deductions for Patino from proceeds of the sale of

Mechanize for PROFIT with JEFFREY UNITS



CRUSHERS— The Jeffrey **Type B Swing** Hammer Crusher for severe duty. **Being used successfully on limestone, shale, slate, clay, chalk,** marl, gypsum, phosphate rock **and asbestos rock.** Shown is a 36" x 24" unit.

Jeffrey equipment for metal mine operation has gained a favorable reputation for ruggedness, versatility and economy over many years of service to the industry.

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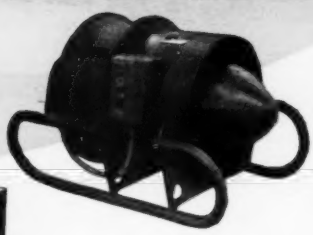

BLOWERS

5 H.P. units for use with tubing for auxiliary ventilation inside the mine. Volume — 6200 C.F.M. free delivery. Non-overloading. Induction Motor — 3450 R.P.M. In open or permissible equipment.

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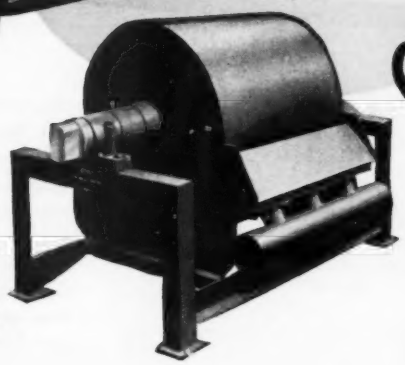
The Grizzly Feeder shown provides both a feed and non-clogging grizzly in a single unit — is extremely flexible — handles large tonnages. Also Pan Feeders.



MAGNETIC SEPARATORS

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It is interesting to note that the required new equipment is being furnished from many areas. A considerable share, including a Dorrco FluoSolids System for calcination of the raw rock, is being supplied by Dorr from the United States. Dorr-Oliver in Milan is manufacturing the filtration equipment, and the client is purchasing the balance direct from European sources most advantageous to him.

In all, the full resources of all departments of Dorr and two of its Associated Companies abroad, as well as manufacturing facilities on two continents were placed at the client's disposal in order to provide the best answer to his particular problem.

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tin ores from the Patino mines. A sliding scale of payments is tied to the price that the Bolivian government can obtain for the tin: at less than 80 cents a pound, no compensation; 80 cents to 90 cents, 1 percent of the gross; 90 cents to $1.06, 2½ percent; $1.06 to $1.21½, 5 percent; and over $1.21½, an additional 1 percent for each six cents more than the $1.21½. The total amount of compensation to be paid has still to be decided. While only the Patino interests are covered by this agreement, it is expected to pave the way for similar agreements with *Cie. Aramayo de Mines en Bolivie* and *Mauricio Hochschild (SAMI)* whose properties were also nationalized. The Bolivian government has now asked for a long-term sales contract from the United States.

BRAZIL—A partial survey made by the *Beryllium Corporation* in the states of Minas Gerais and Bahia has shown an estimated proven figure of 40,000 tons of beryl. Other surveys and opinions indicate a possible reserve of 200,000 tons in this area, and about 50 percent more beryl in the northern and northeastern parts of the country.

GUATEMALA—The decreasing world price of lead and zinc reportedly has led to the closing of the *Compania Minera de Huehuetenango* S.A. operation in the Huehuetenango district. The mine has been in production for about three years.

BRAZIL—The *Companhia Nacional de Alcalis* and a group of French capitalists —Jean Petit Lagranger, Louis Blanquier, and Edouard Charles Krebes—have signed a contract to build a sodium hydroxide plant at Cabo Frio, state of Rio de Janeiro. About $13,000,000 will be spent on the project, with all of the machinery coming from France.

MEXICO—Several new plants are currently being installed. *Negociacion Minera Santa Maria de la Paz y Anexas*, S.A. at Matehaula, San Luis Potosi, is installing a 400-ton selective flotation plant, while the *American Smelting and Refining Company* is completing installation of a 400-ton lead-zinc selective flotation plant at La Palomas, Sinaloa. Already in operation is a 100-ton Denver flotation plant at the fluorspar properties of *Florite de Mexico, S.A.* at Muzquis, Coahuila.

ARGENTINA—Geologists have completed a preliminary survey of Barker in the province of Buenos Aires, an important zone of clays, iron, and lime deposits. Output of clays is about 10,000 tons yearly, and about 2,600 tons of iron ores (hematite and limonite). As a result of this investigation, a complete geological survey has been recommended. Included would be some drilling to estimate the tonnage of reserves.

BOLIVIA—The *Huanuni* tin mine's production figure has been higher since the nationalization of the tin mines by the government. However, this is due to the discovery of several rich veins just before nationalization took place.

VENEZUELA—Iron ore production for the first three months totalled 529,969 tons. Last year's total output for the entire year was 1,969,802 tons.

BOLIVIA—Tin mine production is beginning to slow down, as effects of the government's nationalization program are felt. Main reasons for the serious downward trend are said to be lack of discipline, lack of spare parts, lack of capable top management because of purely political appointments to these positions. It is said that every worker fired since 1947 must be rehired if he requests employment. Consequently, the mines are employing more workers than they have jobs for. With 40 percent of the tin production unsold, and with a low tin price and soaring production costs, the situation grows steadily worse.

MEXICO—The *Gulf Sulphur Company*, a subsidiary of *Pan American Sulphur Company*, has intensified work on its sulphur concession at Jaltipan, Vera Cruz. Two drills, bought in the United States, have already been placed in operation, and four others are on order. The company is negotiating with the miners union for additional help required by its expansion program.

BOLIVIA—The ventilation system is being improved at the *Pulacayo* lead-zinc mine where development work has been particularly difficult because of the high temperatures underground. Many of the working places have a temperature of from 93° F. to 131° F. and some of the mine water containing carbon dioxide reacher 148° F. Some of this hot water is used in the flotation plant.

MEXICO—Currently in use in the world's second largest sulphur recovery plant—that of *Petroleos Mexicanos* at Poza Rica—is a new process for refinement of sulphur which cuts costs and eliminates dangers from blasting. In this new process a continuous stream of molten sulfur is poured onto a horizontal steel conveyor belt 32 inches wide by 184 feet long between pulley centers. The belt is fabricated of special stainless steel imported from Sandviken, Sweden. Narrow rubber edging holds a pool of liquid sulfur on the upper strand of the belt, which in turn drags along the top of shallow tanks from which cooling water overflows. The belt, in effect, floats on the overflowing water and in so doing cools and solidifies the sulfur pool. A ribbon of solid sulfur separates from the belt at the discharge end and is broken into glass-like chips of sulfur about $\frac{3}{16}$ of an inch thick by 3 to 4 inches on a side.

JAMAICA—Clifford B. Murphy, a United States industrialist, is reported to have discovered a copper-lead-zinc ore deposit in the old *Hope* mines at St. Andrew. Arrangements are being made with the government for mining of the metals. Mr. Murphy has also received a prospecting lease to search for other veins in the area.

BRAZIL—Atomic mineral deposits at Sao Joao d'El Rey in the State of Minas Gerais, may contain from 2 to 10 percent uranium. They are now being studied by Brazil's *National Research Council*, in cooperation with the *National Department of Mineral Production*. The uranium deposits occur in the form of djalmate $[U,Ca,Pb,Bi,Fe)(Ta,Cb,Ti,Zr)_2O_7 \cdot NH_4O]$ which is found associated with cassiterite.

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U.S.A. Metal & Mineral Prices

METALS

		July 13, 1953
COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	29.75¢-30.00¢
	Lake. Delivered, destinations U.S.A.	30.125¢
	Foreign Copper. Valley basis	29.50¢-30.00¢
LEAD:	**Common Grade.** New York	13.50¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	$173.70
	Eastern	11.25¢
ZINC:	**Western**	11.50¢
	Tri-State Concentrate, 60% zinc, per ton Eagle-Picher	$ 70.00
ALUMINUM:	**Primary 30 Pound Ingots (99%) plus).** F.o.b. shipping points	20.5¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	35.00¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$2.00
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.40
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.00¢
MERCURY:	**Flasks.** Small lots, New York	$192.00-$194.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery, Port Colburne, Ontario	60.00¢
TIN:	**Grade A Brands.** New York (Price per pound)	121.50¢
TITANIUM:	**99.3%** + (Price per pound)	$5.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90 1/2¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:		$93.00 per ounce
ZIRCONIUM:	**Powder,** 100 pound lots, per pound	$7.00

ORES AND CONCENTRATES

BERYLLIUM ORE:
10 to 12% BeO. F.o.b. mine, Colorado ..... $45.00 per unit
Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.

CHROME ORE:
F.o.b. railroad cars eastern seaports. Long tons dry weight.
African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio ..... $44.00-$46.00
African (Transvaal). 48% Cr_2O_3. No Ratio ..... $34.00-$35.00
Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio ..... $54.00-$56.00
U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.

COLUMBIUM-TANTALUM ORE:
At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore.

IRON ORE:
Lake Superior. Per gross ton Lower Lake Ports.
Mesabi, Non Bessemer, 51.5% Fe. Second quarter $9.90
Mesabi, Bessemer, 51.5% Fe. Second quarter $10.05
O.d Range Non Bessemer. Second quarter $10.15
Old Range Bessemer. Second quarter $10.30
Swedish, Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit ..... 20.00¢

MANGANESE ORE:
Metallurgical grade. 46 to 48% Mn. Long ton unit ..... $1.15-$1.17
Chemical grade. 80% MnO_2. Per ton $70.00
Domestic U. S. Government ore purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treatment costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long dry ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.

MOLYBDENUM CONCENTRATE:
90% MoS_2. F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers $1.00

TUNGSTEN CONCENTRATE:
Domestic. 60% WO_3 Per short ton unit $65.00
Foreign. 65% WO_3 Per short ton unit $50.00

URANIUM ORE:
Carnotite-Roscoelite. F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.

VANADIUM ORE:
Carnotite-Roscoelite. V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock. ..... Per Pound V_2O_5, $0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois-Kentucky mines	$42.50
	Mexican. 70% f.o.b. border	$30.00
	Acid Grade. 97% CaF_2 f.o.b. Kentucky, Illinois, Colorado	$60.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

		June 12, 1953 Per Metric Ton	USA Equivalent cents per pound[1]
COPPER:	**Electrolytic**	£252 0s 0d	31.50¢
LEAD:	**Refined, 99.97%**	£91 5s 0d	11.41¢
ZINC:	**Virgin, 98%**	£72 0s 0d	9.00¢
ALUMINUM:	**Ingot, 99.5%**	£150 0s 0d	18.75¢
ANTIMONY:	**Regulus, 99.6%**	£237 10s 0d	29.69¢
TIN:	**Standard, 99.75%**	£600 0s 0d	75.00¢
TUNGSTEN:	**Long ton unit, 30Ss, equivalent to**		$42.70

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

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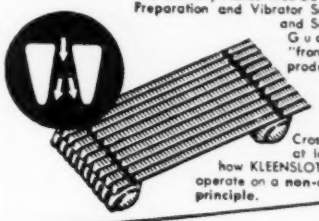
FOR DEWATERING, SIZING AND SCREENING OPERATIONS
The mining industries can't afford to overlook this product. Accurate openings, great strength, long life and economy makes WEDGE-WIRE Preparation and Vibrator Screens and Screen-Guards "front line" products.

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Your naked eye can't spot diameter differences in new cables. That's why it's important to check promptly when you *do* see variations in cable after it's been used. It has probably been crushed . . . by runovers or rib-pinching. Compression cuts may let in moisture *to shorten cable life.*

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As tough as we can make it—regardless of cost. One break in a cheap cable costs more than you can save by buying on price. The new ANACONDA Cables mean lower costs to you because they can take much more abuse. In fifteen mines recently surveyed, the average life of ANACONDA Cables on shuttle cars jumped 300% over cables used only a few years ago.

WHY THE NEW ANACONDA CABLES LAST LONGER

A stronger jacket, made from a new neoprene compound, resists heat, flame and moisture better. In wet mines, sliver-cuts that may cause shocks are less likely to occur. A new cold-rubber insulation means new toughness. Moisture-wise and puncture-wise both. A new type of stranding improves the flexibility of these cables under stress.

YOU BE THE JUDGE

Examine an ANACONDA Cable. See why these things are so. Call your nearest Anaconda Sales Office or Distributor for a sample. And remember: no ANACONDA Cable has ever failed a U.S. Bureau of Mines flame-test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

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TODAY'S HEADQUARTERS FOR MINE CABLE

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

Heavy Duty Transmission Means High Performance

Through advanced design combined with efficient gearing, Heiliners squeeze extra high performance from their 300-hp. Diesels. The Series 800 Heiliner moves as much as 20 yards at speeds up to 25 miles per hour.

Fuller heavy duty 5-speed model RTA-1120 transmission gives it a power-

backed ratio for every job condition—up steep grades, through clinging mud, or in soft sand. For further information on Fuller transmissions, circle No. 58.

Simplified Gold Recovery From Sand and Gravel

The Excelsior Products Company has in production a newly-invented trommel-type oscillating concentrator powered by a gasoline engine designed to recover gold from alluvial deposits.

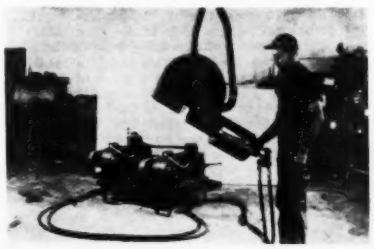
Field tests on the new machine have indicated that applications can be successfully broadened to include the recovery of uranium and other heavy minerals

from sands and gravels. For complete details on this new simplified beneficiator, circle No. 62.

Mobile Guillotine Cutter Provides 150 Tons Thrust

The new Manco Mfg. Company's suspension-type guillotine, Model 25-EE, combines tremendous thrust with relative mobility and will cut up to 2¾-inch diameter steel rod in 13 seconds. Adaptable for riveting co'd rivets up to 1 inch and for punching and pressing, it is particularly advantageous where taking the tool to the job is desirable.

The easy-action hand lever control is manual, eliminating solenoids. The unit



provides a 360 swivel and the cutting head weighs 470 pounds. Two Manco electric hydraulic pumps mounted in tandem provide the 150-ton thrust. For complete information, circle No. 65.

New Loading Attachment For Stockpile Handling

A new high-speed stockpile loading attachment has been developed by Athey Products Corporation for their model 3 force-feed loader. This loader, the first of its type on the market, has long been considered the best tool for loading windrowed materials. The new auger-type feeding mechanism will pour forth a constant stream of free-flowing stock-

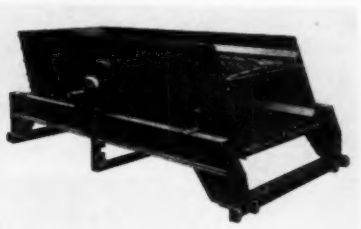
piled material at rates up to 10 cubic yards per minute.

The attachment is available either as original equipment on loaders shipped from the factory or as an attachment which can be installed on machines already in the field. Circle No. 71.

Vibrating Screen Series Offers Higher Efficiency

Diamond Iron Works is now producing a new model vibrating screen which has been undergoing field tests for the past two years. The new 5-foot wide series of vibrating screens are available in 10, 12, and 14-foot lengths. Adaptable for any installation, they offer a choice of 1, 2, 2½, or 3 decks and are designed for high production while assuring freedom from work stoppage.

Specifications include Timken double row roller bearings; rubber mounted main bearing cages; adjustable spring balance cups; and screen clamp bars over the center supports. Positive vibrating action due to the four-bearing construction, plus plenty of headroom between decks, assures faster separation of material over the entire screening area.



Diamond's construction maintains a high rate of production without clogging.

The screens can be driven with either "V" or flat belt drive and can be easily equipped with spray bars for washing operations. For full information and engineering details, circle No. 73.

Aluminum 45-ton Haulers Built for Alcoa by Euclid

A fleet of seven experimental light weight haulers, built of an aluminum-magnesium alloy with excellent welding qualities recently developed by Alcoa, is being delivered to Aluminum Company of America by the Euclid Road Machinery Company.

To be used at Alcoa's Rockdale, Texas plant, the new light weight trailers have

a capacity of 45 tons. This is 5 tons greater than the standard Euclid 40-ton hauler of equivalent power, yet the trailer body weighs approximately one-third less than standard steel units.

When used with the newest welding processes, Alcoa's A548 alloy provides great strength and ductility for applications such as welded bulk haulage units.

The new Euclids are powered by Cummins 300-hp. Diesel engines and have a struck capacity of 61 cubic yards. Equipment includes a 10 speed transmission, air assist clutch, and hydraulic booster steering. Circle No. 72.

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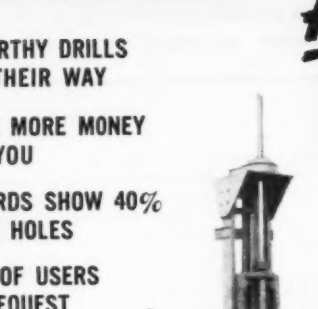

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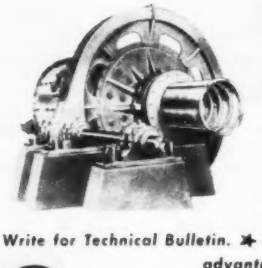

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HOW TO WIN CASH AND INFLUENCE BANKERS: Hmmmm. Well that's what this release says. It refers to a new book, "How to Raise Cash and Influence Bankers," by Arthur H. Richland, published by Business Reports, Incorporated, Roslyn, Long Island, N. Y., and sold for $12.50 per copy. Evidently following the theory that you've got to spend money to get money. Richland is a well-experienced banker himself so maybe he's got some inside info not available to us common folk. If you're interested, write the company. Enclosing, of course, the necessary pin money.

HEAVY DUTY APRON FEEDERS: Universal Engineering Corporation has announced the release of a new brochure on their extra heavy duty apron feeders designed for mines and mills. Get bulletin no. U536 by circling no. 1.

HARDEN YOUR ROCK BITS: Doughty Laboratories, Inc. sells a compound called Hard-N-Tuff which it claims will extend the life of rock bits three to five times. It is applied to churn-drill bits, percussion-type bits, by a simple heat-dip-heat process that works in with normal tempering and annealing processes. For further information, circle no. 2.

DUMP CARS: Baldwin-Lima-Hamilton's dump cars (large size) are quick dumping and quick righting. Powerful low-pressure air cylinders control the action. For more information, circle no. 3..

MAIN ELECTRICAL CABLES: Simplex High-Voltage cables are designed for use in shafts, adits, or boreholes. They are available in single- or multi-conductor types for voltages from 2,001 to 17,000. Circle no. 4.

UNDERGROUND POWER CENTER: This packaged unit, the Westinghouse "Power Center," includes transformers, circuit breakers, case, and plug-type incoming and outgoing connections. Circle no. 5.

RING DRILLING: Gardner-Denver's new SFH99 rock drill was specially designed for long-hole ring drilling. In a 7-foot sublevel, it allows for a 4-foot change. For complete information, circle no. 6.

DRILL JUMBO: LeRoi-Cleveland Jumbos are self-leveling. A special offset arm allows miners to drill lifter holes without swinging the drill under the arm. Circle no. 7.

GYRATORY CRUSHER: The new Kennedy-Van Saun gyratory has two unusual features: Twin steep-angle (70-degree) discharges prevent pileup of sticky ore. And it is gearlessly driven by a synchronous motor. Circle no. 8.

CURVED-PLATE JAW CRUSHER: A key feature of the Traylor Type S Jaw Crusher (this is the big one) is the curved stationary plate. It applies crushing force at an angle that reduces sliding wear and gives increased crushing. And it concentrates maximum thickness of plate at the wear point. Circle no. 9.

UNDERGROUND DIESEL TRUCKS: Dart's new truck is only 60 inches high, yet carries 18 tons. It's powered by a 275-hp Diesel engine fitted with an exhaust scrubber, and has a newly designed low-head dumping system. Circle no. 10.

DREDGE PUMP: The Morris Type G dredge pump has specially designed bearings that allow it to run at higher speeds. It can frequently be directly connected to Diesel drives, or can be run through a low-reduction gear unit. Circle no. 11.

CABLE SUPPORT OR RACK: Unistrut framing consists of re-usable steel members which can be installed without drilling holes. It can be used in tunnels or buildings, as a rack, pipe- or cable-support. Circle no. 12.

VENTILATION TUBING: The Spiratube-M booklet explains how this ventilation tubing is made and how to use it. Circle no. 13.

TRACTOR CABLE CONTROLS: Caterpillar cable controls, both rear and front mounted, are discussed thoroughly in a new Cat booklet explaining the precise, efficient, and trouble-free operation possible with these units. Circle no. 14.

SUSPENDED MAGNETS: A new catalog, no. 752, describes and illustrates the complete line of Memco high power suspended magnets manufactured by the Magnetic Engineering and Manufacturing Company. They're available in medium, standard, heavy duty, and extra heavy duty types in sizes ranging from 12 inches to 60 inches wide. Circle no. 15.

LIGHTER, STRONGER TRUCK BODIES: The Galion Allsteel Body Company has announced that, effective immediately, it will employ high tensile steel exclusively in the construction of its complete line of dump truck bodies, ranging from 3 to 27 tons. This material, used previously only in special bodies, will make possible weight savings up to 25 percent. For further details, circle no. 17.

MINE ROOF COATING: A new mine roof or back coating that penetrates rock strata and forms a protective coating against moisture—and resultant loosened rock—is now available after years of field and laboratory testing. Called Das-Seal, the new compound is a development of the Dasco Chemical Company. For full information, circle no. 18.

HOSE CARE: "Dangers Under Pressure" is a new safety booklet distributed by Hose Accessories Company. Prepared for the benefit of hose users to aid in securing trouble-free service life of hose and hose couplings, the publication explains in detail the proper application and maintenance of hose and allied equipment. Circle no. 19.

TRACTOR CASE HISTORIES: Case histories of production results experienced by operators of International Harvester crawler tractors in the excavation, logging, and road building fields are covered in three new bulletins, E-53-C, E-54-C, and E-57-C. For your copies, circle no. 20.

HYDRAULIC DUMP BODIES, HOISTS: From St. Paul Hydraulic Hoist comes a new three-color, eight-page catalog on the company's complete line of heavy duty dump bodies and hoists for on and off highway service. Circle no. 21.

LOW-H ELECTRODES: A technical bulletin titled, "The Facts About Low Hydrogen Electrodes," deals with recent technical developments in the low hydrogen electrode field, and includes chapters devoted to procedures and applications. Authored by R. K. Lee, vice president in charge of research, and J. O. Cavanagh, technical director, the booklet is published by Alloy Rods Company. Circle no. 22.

BETTER BACK HOE BUCKETS, BEGORRA! A new catalog sheet, describing the advantages of Amsco all-manganese steel back hoe buckets, has been released

Circle numbers and mail this card for free product literature

To get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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by the American Manganese Steel Division of the American Brake Shoe Company. Get your copy by circling no. 23.

GEIGER COUNTERS: The Detection Company has redesigned their line of portable Geiger counters. Literature on these new 1953 units is now available. Write the company at Dept. W, 5420 Vineland Avenue, North Hollywood, California, or circle no. 25.

ROPE FITTINGS: Sauerman Bros., Inc., manufacturers of scrapers and cableway excavators have made available a new 6-page brochure containing blueprints, tables, and ordering information on open and double wedge sockets, pins and continuous cable clamps. Write the company at Dept. M-20, 522 S. Clinton Street, Chicago 7, Illinois, or circle no. 26.

DIESEL-POWERED TRUCKS: Cummins Diesel-powered Euclid trucks, from 15 to 40 tons, are described in a 16-page booklet recently published by the Euclid Road Machinery Company. The power units covered range from 165 hp to 300 hp. Circle no. 27.

HOLE DIGGER: The Super Hole-A-Matic, developed and manufactured by Eugene John Freeman & Company, digs holes from four to eight inches in diameter up to three feet deep at any angle. It's a lightweight, one man, portable hole digger designed for short holes in soft or hard earth or shale. For further information, circle no. 28.

CONTROL EQUIPMENT MAINTENANCE: What to look for in maintaining control equipment properly is told in a new eight-page manual entitled "Proper Maintenance of Control" released by Allis-Chalmers Manufacturing Company. For a copy, circle no. 29.

EXTENDABLE CONVEYOR: A new extendable shuttle conveyor has been developed by Hewitt-Robins Incorporated. Originally designed to fill the gap in the mechanized flow of material from mine face to the surface and the mill, it is adaptable to all kinds of mine and quarry use. For full information, circle no. 30.

TRACTOR DOZERS: Announced by Gar Wood Industries, Inc. is a new catalog showing the 15 models of cable and hydraulic dozers and 3 models of control units available for Allis-Chalmers tractors. Circle no. 31.

NEW VERSATILE BIN-DICATOR: An all-new, lower-priced model in the popular Bantam Bin-Dicator, bin level indicator, is now available. It can be mounted outside of thin-walled bins, inside thick-walled or multiple compartment bins, or suspended within bins. To get full details, circle no. 32.

ROOF BOLTING: The development of a steel expansion anchor for roof bolting in mines has been completed by the Mining Products Division, Equipment Corporation of America. Features included are: sharp edges on the upper surface for quick starting, corrosion resistant finish, maximum bearing surface between plug and inside surface of the sleeve. For further information, circle no. 34.

GATES AND VALVES: A recently-released Stephens-Adamson Manufacturing Company bulletin covers their complete line of gates and valves. Unusual units listed include the "Twistite" and the Moore Bin Gate. The former unit consists of two rubber sleeves which are twisted shut by a rotating collar, forming a dust and water tight lock. The Moore Bin Gate, for heavy duty applications, consists of an apron belt which can be rolled away from the bin opening. Circle no. 35.

CHAIN BELT CATALOG: An abbreviated catalog on Rex cast and steel chain, cast tooth sprockets, belt conveyor idlers, and spray nozzles has just been published by Chain Belt Company. The 56-page book is a useful index of information on this and allied equipment. Circle no. 36.

MASS RATE FLOWMETER: The Control Engineering Corporation has published an engineering brochure on the design and application of a true mass rate flowmeter. The new device is capable of measuring the mass flow of any gas, liquid, solid, or mixture which can be made to flow or will even fall through a pipe. For a copy of this release, circle no. 37.

INDUSTRIAL FLOTATION APPLICATIONS: Of possible interest to mining men is a new bulletin published by Denver Equipment Company and written by L. A. Roe, technical supervisor, Division of Ore Research, Jones & Laughlin Steel Corporation. The paper covers many uses of froth flotation in the recovery of valuable constituents in near-colloidal and sludge waste products from chemical and industrial plants. Circle no. 38.

BLASTING MOVIE: A new 15-minute 16mm sound film produced by the Atlas Powder Company shows how modern methods make blasting an orderly, controlled sequence precisely adaptable to the type of rock, the surroundings, and the specific result desired. For information on obtaining this film, circle no. 39.

CORE BARREL BULLETIN: Sprague and Henwood, Inc. has now published a folder on the series "M" core barrel that contains information not before in print. This is the core barrel Sprague and Henwood developed specifically to secure higher core recovery in fractured, porous or soft formations. Circle no. 40.

SUPAIRTHERMAL ENGINES: Nordberg Manufacturing Company's big (2,400 to 4,260 hp) Supairthermal V-type engines are described in a newly-released bulletin. These stationary and marine engines are available in diesel, dual-fuel, or spark-fired gas models. Circle no. 41.

SHOVEL-DRAGLINE-CRANE: Baldwin-Lima-Hamilton Corporation's bulletin no. 204-A fully describes the rugged Lima type 2400, convertible six-cubic-yard shovel, 110-ton crane, and dragline of variable capacity—with provision for applying longer booms and handles for high lift shovel work. Circle no. 42.

DIAMOND PUBLICATION: The Industrial Diamond Association of America, Inc. has launched a new publication, "The Diamond that Pays for Itself." It's written for the man in the shop who has not too much time to read, but wishes to absorb all the useful information possible. If you'd care to get a copy, circle no. 43.

INDUSTRIAL BULLETIN IN SPANISH: "Industrial Bulletin," published by Arthur D. Little, Inc., is now available in a Spanish edition for those many readers who have requested it. If you'd care to have information on this Spanish edition of the famous Industrial Bulletin, circle no. 44.

MOBILOADER: Athey Products Corporation's new model of its versatile MobiLoader is reportedly better than ever. An Athey bulletin on the unit is available. Circle no. 45.

For Free Product Literature see other side

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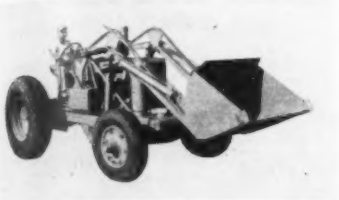
Front End Loader Is Diesel Powered

The combintion of cheap Diesel power with front-end loading up to 5,000-pound capacity is featured in the Baker-Lull Shoveloader mounted on a Sheppard industrial wheel-type tractor.

The manufacturer points out that Diesel power will return fuel cost savings up to 75 percent, compared with the op-



eration of gasoline powered equipment. Other advantages include extremely low relacement costs (Sheppard Diesel fuel pumps have only one moving part), an 8-speed transmission that permits full throttle operation at each job speed, and the design of Sheppard tractors for use in critical conditions of mud, water, and uneven ground.

The Baker-Lull Shoveloader, available with seven materials handling tools, is said to have 66 percent more lifting power than comparable units. Circle No. 59.

Big Side-Dump Body Largest of its Type

The new 30-ton Easton lift-door, side-dump truck body, one of a fleet recently delivered to an overseas iron mining op-

eration, is reportedly the largest of its type ever built.

Designated as Model BL-1530, the body follows Easton Car & Construction Company's standard lift door design except for the special floor reinforcing plates of 4- by 1-inch abrasive-resistant steel welded into position. The body is mounted on a Dart model 300 Diesel-powered 6-wheel chassis. Circle no. 64.

New Features Available For Allis-Chalmers Graders

Front wheel lean and power circle turn are now offered as optional equipment for the Allis-Chalmers 40-hp., 8,800-pound, tandem-drive, model D motor grader. These new accessories increase the versatility of this grader so that it meets more work requirements in this class of grader than ever before.

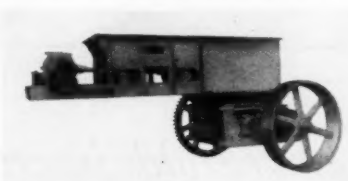
Mechanism for the front wheel lean includes axle and steering knuckles, additional tie bar, and wheel lean cylinder. The wheel lean has a range of 25 degrees each way, giving ample range for ditching and for counteracting side draft.

The power circle turn is operated by a hydraulic motor and reduction gear

and includes a new circle. Self-cleaning teeth mounted on the outside of the circle, and self-locking reduction gears are used on the model D. The new circle is designed to provide the same three-point mounting and provision for adjustment as on the standard model D and other A-C motor graders. Circle No. 70.

Reciprocating Plate Feeder Has 500-tph Capacity

A new McLanahan Reciprocating Plate Feeder, designated as the model HDF, has a capacity range of up to 500 tons per hour, and is recommended by the manufacturer for feeding all sizes of materials. The model HDF is an addi-



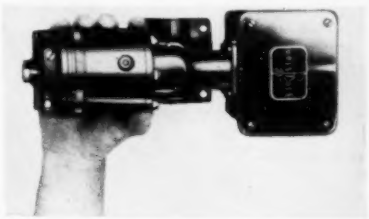
tion to McLanahan's line of reciprocating feeders for processing all kinds of materials from fines up to the largest shovel feeds.

The unit employs the bottom-feed principle, with capacity governed by speed and stroke of the reciprocating bottom plate. It is readily adapted to any kind of hopper or crusher and will handle materials from trucks, cars, hoppers, storage bins, etc. The rate of flow of materials from the feeder can be controlled to synchronize with the production capacity of any machine, elevator, conveyor, or other equipment. Circle No. 74.

Pneumatic Transmitter For Controlled Readings

A miniature pneumatic transmitter for measuring and transmitting readings of temperature, pressure, vacuum, differential pressure, and liquid level to recording, indicating, and controlling receivers, including miniature type receivers, has been announced by The Bristol Company. Transmission is by means of air pressures of between 3 and 15 psi that have a direct relation to the measured quantity.

This new type of transmitter, known as the Bristol Series 650, uses standard Bristol measuring elements and a simple transmitting mechanism. The transmitter is sensitive to extremely small changes in the measured value, as little as 0.03 percent of range, including reversal.



High-speed transmission and superior control result from the use of a pneumatic relay which has an output capacity of 3.0 scfm. Circle No. 66.

Conveyor Belting Is Rubber-Cleated

Goodall Rubber Company is now marketing a new rubber conveyor belting with rubber cleats incorporated as integral parts of the belt itself. Originally developed for a nationally-known foundry for conveying metal stampings, this belting has been thoroughly field-tested on several installations, and has met with

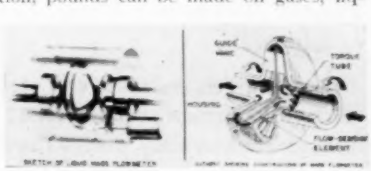
considerable demand among bulk handlers of a wide variety of materials.

Advantages over the usual angle-iron riveted- or bolted-on cleats include freedom from breakage and consequent replacement costs. For further information, circle No. 75.

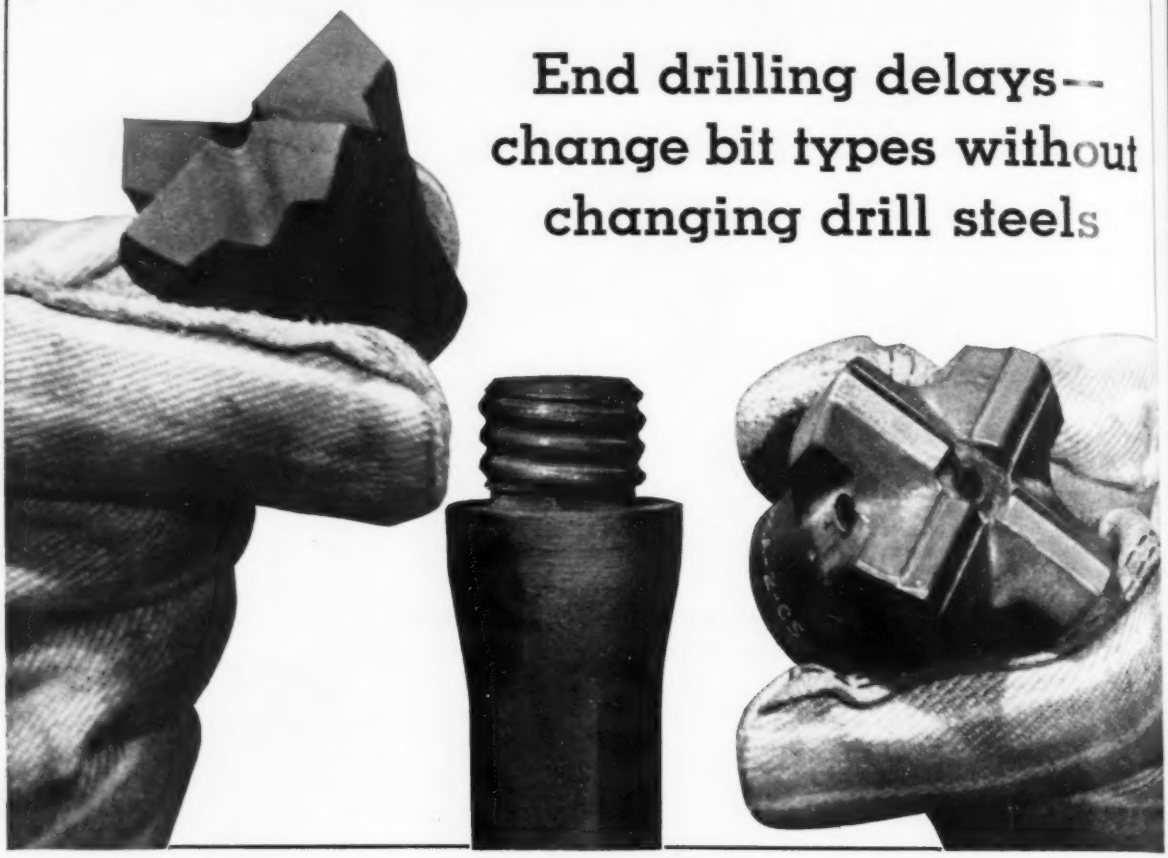
New Flowmeter Measures Flow of Liquids, Slurries

An instrument capable of measuring the true mass rate of flow of anything that will flow or fall through a pipe has just been announced by the Control Engineering Corporation. The mass meter is unique in that it actually responds to pounds and is totally insensitive to volume.

Direct reading measurements in terms of pounds per minute or with integration, pounds can be made on gases, liq-



uids, slurries, or particles in an air stream, all with the same instrument. Accuracy of the measurement is completely independent of volume, temperature, pressure, viscosity, compressibility, or external accelerations. For complete information, write the company at Norwood 78, Massachusetts, or circle No. 68.



End drilling delays--change bit types without changing drill steels

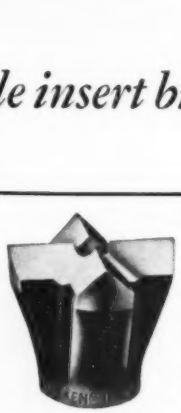
93 Timken® multi-use and carbide insert bits fit the same steel!

YOU can quickly switch from one bit type to another, and always be sure of using the most economical bit for the ground, when you use Timken® rock bits. That's because as many as 93 different Timken multi-use and carbide insert bits are interchangeable on the *same* drill steel.

The switch is made in minutes. The driller simply unscrews one type of Timken bit and screws the other type on the same drill steel. No time wasted switching steels. No need to stock expensive double inventories of drill steels.

Both Timken multi-use and carbide insert bits give you two important advantages: 1) made from electric furnace Timken alloy steel, 2) special shoulder union keeps drilling impact from damaging the threads.

Our rock bit engineers stand ready to help you with your drilling problems. They're experts in keeping drilling costs to a minimum. There's no obligation. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE TIMKEN MULTI-USE BITS CUT COSTS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest costs per foot of hole when full increments of steel can be drilled.

WHERE TIMKEN CARBIDE INSERT BITS CUT COSTS

Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small-diameter holes, very deep holes.

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...your best bet for the best bit...for every job

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Chief Consolidated Will Expand With DMPA Aid

Chief Consolidated Mining Company in the Tintic mining district of Utah with headquarters in Salt Lake City, Utah, plans to develop ore bodies containing an estimated 487,000 tons of ore under terms of a contract between the company and the Defense Materials Procurement Agency. Estimated cost of resuming large-scale production of lead and zinc is $1,416,865, of which DMPA will advance up to $283,373, to be repaid with interest from returns of the new production.

The development program, in part an extension of an exploration contract between DMPA and the company, will extend over a period of three years. Development will be between the 1,200-foot and the 3,100-foot levels.

Bear Creek Diamond Drills for Lead-Zinc

The Bear Creek Mining Company, the exploration subsidiary of the Kennecott Copper Corporation, has started a diamond core drilling exploration program in the Bonanza district, Saguache County, Colorado. A machine located on the surface, will drill to perhaps 1,200 feet in the search for lead-zinc mineralization under the supervision of W. I. Burgin, Bear Creek's Colorado exploration geologist.

According to reports, this is Bear Creek's first Colorado exploration project under the supervision of Dr. James Boyd, former dean of the Colorado School of Mines, who is now Bear Creek's exploration manager with headquarters in New York, New York.

The *Golden Cycle Corporation* has designated Benjamin Slothower as mine foreman for its new uranium mining division. Headquarters for the new division are at Uravan, Montrose County, Colorado. At the Golden Cycle U. S. Atomic Energy Commission lease on Atkinson Mesa four miles from Uravan, contractors have started sinking the 650-foot, two-compartment vertical shaft to reach the uranium-vanadium ore-bearing horizon.

The *Minerals Engineering Company* of Grand Junction, Colorado, contracted to sink the new vertical shaft for the *Shattuck Denn Mining Company* near Uravan, Montrose County, Colorado, according to Ray Sullivan, Minerals Engineering vice-president and project manager. The new vertical shaft will be sunk on the recently awarded Shattuck Denn U. S. Atomic Energy Commission lease on Club Mesa west of Uravan.

In the Club Mesa uranium district west of Uravan, Colorado, the *La Salle Mining Company* and the *Marklay Mining Company* are continuing to make regular production of uranium-vanadium ore. Ore is trucked to the near-by *U. S. Vanadium Company* processing plant at Uravan, Colorado.

The *Climax Uranium Company* has closed its mining operations in Monument Valley, San Juan County, Utah. Mining crews have been shifted to the expanding operations of Climax in the Lukachukai Mountains of northeastern Arizona. Lukachukai ore is sold to the U. S. Atomic Energy Commission's ore buying depot for stockpiling at Shiprock, New Mexico.

The *Pittston Company*, a major Pittsburgh, Pennsylvania coal holding company and associate of the *Sheridan Coal Company* of Sheridan, Wyoming, has had geological scouts investigating uranium-vanadium mining possibilities on the Colorado Plateau. Scouting headquarters have been established at Grand Junction, Colorado.

The *Climax Molybdenum Company* has taken a lease and option on a group of claims east of Kokomo, Summit County, Colorado. The claims are about five miles airline distance from the Climax deposit and are on the southwest side of the Ten Mile Canyon from Climax. Climax plans a geological and diamond drilling program to delimit and sample molybdenum and tungsten mineralization in a contact metamorphic zone surrounding a quartz monzonite stock intruded into the Pennsylvania sediments. Some mineralization has also been found within the stock.

The *American Smelting and Refining Company* has one surface diamond drill operating in the Kokomo, Summit county lead-zinc district. Drilling has been underway in the vicinity of Asarco's *Lucky Strike* and *Victory* mines. These mines were once large lead-zinc producers, but mining operations were discontinued there several years ago.

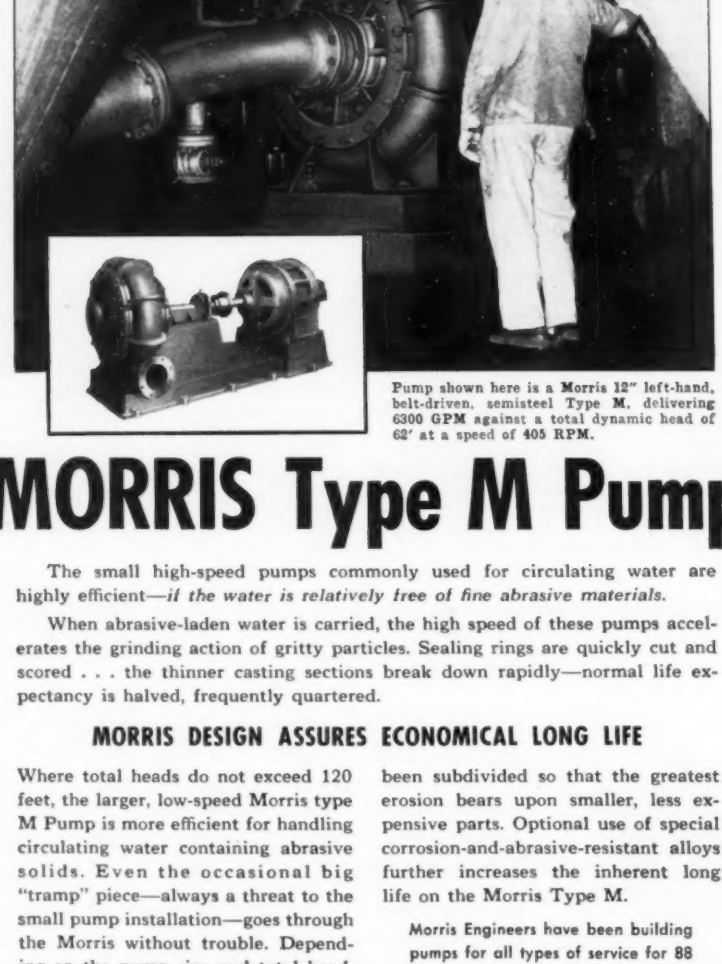
The *Venture Leasing Company* has started its 50-ton differential lead-zinc flotation mill in California Gulch, San Juan County, Colorado. Venture Leasing is a partnership composed of C. L. Larson, John Cook, and William Gianetto; it has developed the Gold Prince mine and erected the new mill. The mill was virtually completed late in 1952 but heavy snows at the 12,500-foot altitude prevented operation until this year.

The *Shenandoah Dives Mining Company* has received a $250,000 Defense Minerals Exploration Administration loan for development of the Letter G vein adjacent to its *Shenandoah* mine at Silverton, San Juan County, Colorado. Shenandoah Dives recently suspended active mining operations and applied for the

Officially Certified Discoveries of Ore Reserves by the Defense Minerals Exploration Administration in Colorado, Arizona, Utah, and Wyoming as of June 15, 1953

Company	Mine and Location	Minerals	Initial Value Exploration Contract	DMEA Share in Contract
	COLORADO			
Lupton Mining Company	Grizzly mine, Silver Plume	Lead-zinc	$40,000	$20,000
Utze Lode Company	Madonna mine, Monarch	Lead-zinc	49,500	24,750
East Ridge Company	Andrus mine, Ouray and San Miguel counties	Copper-lead-zinc	60,180	30,090
Cherokee Mines	Larimer County	Uranium	24,000	21,600
Tom C. Stanford	Boulder County	Tungsten	22,250	16,687.50
Bachelor Development Company	Bachelor mine, Ouray County	Lead-zinc	72,503	36,251.50
Outlet Mining Company	Phoenix mine, Creede	Lead	11,237.50	5,618.75
Empire Mining & Engineering Company	Jamestown	Fluorspar	5,425.08	2,712.50
Defender Mining Company	Defender mine, Silvercliff	Lead-zinc	4,799.60	2,399.80
	ARIZONA			
Banner Mining Company	Mineral Hill and Plumed Knight mines, Pima County	Copper	262,578	130,287.50
Nash Mines (James P. Nash)	Anne and Smuggler mines, Patagonia	Lead-zinc-copper	38,600	19,300
	UTAH			
Kentucky Utah Mining Company	—	Copper-lead-zinc	35,000	17,500
	WYOMING			
Continental Sulphur & Phosphate Company	Sunlight Basin mine, Park County	Sulphur	———	———

. . . for overall economy in delivering circulating water



Pump shown here is a Morris 12" left-hand, belt-driven, semisteel Type M, delivering 6300 GPM against a total dynamic head of 62' at a speed of 405 RPM.

MORRIS Type M Pump

The small high-speed pumps commonly used for circulating water are highly efficient—*if the water is relatively free of fine abrasive materials.*

When abrasive-laden water is carried, the high speed of these pumps accelerates the grinding action of gritty particles. Sealing rings are quickly cut and scored . . . the thinner casting sections break down rapidly—normal life expectancy is halved, frequently quartered.

MORRIS DESIGN ASSURES ECONOMICAL LONG LIFE

Where total heads do not exceed 120 feet, the larger, low-speed Morris type M Pump is more efficient for handling circulating water containing abrasive solids. Even the occasional big "tramp" piece—always a threat to the small pump installation—goes through the Morris without trouble. Depending on the pump size and total head, speeds range from a low of 188 RPM to a high of 1119 RPM.

Wearing parts are double the thickness of conventional clear water pumps. With economical upkeep a primary consideration in the design, sections subjected to most wear have been subdivided so that the greatest erosion bears upon smaller, less expensive parts. Optional use of special corrosion-and-abrasive-resistant alloys further increases the inherent long life on the Morris Type M.

Morris Engineers have been building pumps for all types of service for 88 years. Let them consult with you on your pumping problems. No cost. No obligation. Or, send for free Bulletin 175.

MORRIS MACHINE WORKS

Baldwinsville, N. Y.

Representative in Principal Cities

MORRIS *Centrifugal Pumps*

loan with the company furnishing 50 percent of capital needed to drive a 1,400-foot crosscut to the Letter G vein, drift on the vein, and drive a series of raises in the vein. This major exploration program will require many months to complete. The Letter G vein has a good production record from near surface workings. The new exploration program will develop the vein 400 to 600 feet below old workings.

The *Consolidated Uranium Mines* has started development on a uranium-vanadium claim in Bold Canyon, San Miguel County, Colorado. Consolidated is a major uranium producer with mines at Temple Mountain, Emery County, Utah, and has extensive tungsten properties in Nevada. E. G. Frawley is company president with headquarters in Salt Lake City, Utah.

Two new mining operations have been opened in the Breckenridge, Colorado, area. The *Big Four* Mine, located near Green Mountain Dam, is an established silver producer closed by litigation for more than a year. Lessees from Pueblo, Colorado have received permission to relocate the mine portal, taken out the old ore bins, and begun mining. The second property is the *Wapiti Group* on Farncomb Hill, where a year-round placering and underground mining program is planned for the historical producer of crystalized gold.

Lower metal prices were given as the reason for a drop in net profit (before depletion) from $337,723.64 in 1951 to $253,005.50 in 1952 by the *Rico Argentine Mining Company* of Rico, Colorado. A total of 43,659 tons of ore were mined during the fiscal year, which is the highest figure in the company's history. Production came from four areas—the *Argentine, Mountain Springs, Silver Swan,* and *Van Winkle.* Production of concentrates was as follows: gold, 128 ounces; silver, 126,334 ounces; lead, 4,532,651 pounds; zinc, 5,744,386 pounds; and copper, 97,291 pounds. In addition, 1,033 dry tons of fluxing-grade crude pyrite were sold. Average daily tonnage was 146 dry tons and a grand total of 14,768 feet of development work was completed. Flotation cells were added to the mill circuit to upgrade the concentrates, five additional housing units were completed, and a small theater for employees was built and equipped. Future plans call for continuing the rehabilitation of the St. Louis Tunnel and driving it to the Argentine area, as well as development of the "K" and "L" beds in the Mountain Springs area.

Western-Knapp Engineering Company of San Francisco, California has been granted a contract for construction of the new 200-ton-per-day differential flotation mill of the *American Smelting & Refining Company* at Crested Butte, Colorado, and building has already begun. *L. M. Arnett and Company* of Gunnison, Colorado received a sub-contract from Western-Knapp for the construction of a machine shop building, warehouse and compressor room. Other parts of the project include the main mill, assay office, change room, garage building, concentrate bins, and more than 300 feet of snowshed. Western-Knapp personnel at Crested Butte include Robert F. Engle, construction manager; B. H. Martin, construction foreman; E. C. Reed, field auditor; and John Creavens, design engineer. J. F. Frost from the Salt Lake City, Utah office is ASARCO's representative. Con-

struction should be completed in seven months.

Calvin Mining Company recently negotiated a lease with George Baumgardner of Ridgway, Colorado for the entire *Altoona* claims group. Plans are underway to move new mining machinery into the *Yankee Boy* silver-gold-lead-zinc mine near Ouray. As soon as a new 210-cubic-foot truck-mounted compressor, mine cars, track and jack hammers are installed, a crew will begin driving a 1,200-foot crosscut to four veins. Some drifting is planned on each of the veins, ore will be developed and blocked out, and a mill constructed eventually.

The *U. S. Bureau of Mines* reports that improved blasting techniques and reduced breaking costs have been achieved at its experimental oil-shale mine near Rifle, Colorado through use of millisecond-delay detonators instead of the standard ones. A novel aspect of the research, which is part of the Bureau's synthetic liquid fuels program, was the recording of blasting underground for the first time on high-speed movie film.

Consolidated Caribou Silver Mines, Inc. of Nederland, Colorado has taken first legal steps to reorganize. A time schedule has been approved to hear the plan in a Denver federal court and deadlines have been set for mailing copies of the reorganization plan to stockholders, receiving their votes, and for the registration of objections of creditors. The mines were closed last fall and the reorganization plan drawn up when Richard J. Reynolds, North Carolina tobacco executive, attempted to foreclose on a $200,000 mortgage which he holds. Under the new arrangement, Mr. Reynolds would receive a substitute mortgage for $75,000 and a larger proportion of stock in the company. The U.S. Atomic Energy Commission has granted the firm $96,000 to develop pitchblende, but thus far no commercial deposits have been found. Donald M. Nelson, former chairman of the War Production Board, is Caribou president.

Latest development in the multi-faceted Colorado Plateau uranium controversy is the establishment of a list of qualified umpire analysts to which buyers and sellers may send disputed pulps of ore shipments. The *U.S. Atomic Energy Commission* has certified the *U.S. Bureau of Standards*, the *Brown Laboratory* at Grand Junction, Colorado, *Smith's Laboratory* at Moab, Utah, and *LeDoux & Company* in New York. This list will be posted at all ore purchasing stations operated by *American Smelting and Refining Company*. Other processing companies have agreed to post similar lists of umpire analysts acceptable to them in the near future. The AEC has streamlined its own operations by creating a third division at the Grand Junction, Colorado Operations Office which will be in charge of uranium ore processing. John Chapman, AEC chemical engineer, is acting director, and Frank H. McPherson continues as director of the mining division. Processing formerly was combined with mining under the production division. AEC Grand Junction manager Sheldon P. Wimpfen explained that the agency has now been divided into the three distinct aspects of the Commission's work—finding the ore, digging it out of the ground, and extracting the uranium oxide from it. Meanwhile, no appreciable progress has been made in settling the uranium-gas and oil claims dispute. Hearings are continuing on twin House and Senate bills, with both min-

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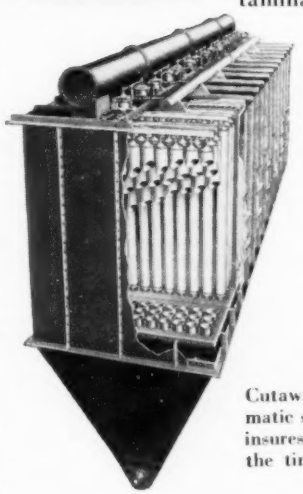

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ing and oil and gas interests claiming that granting clear title to the other would be an unfair infringement upon long-standing rights.

A fire caused by an acetylene torch spark leveled the warehouse, compressor house, machine, carpentry and blacksmith shops, assay office, power control room, and interconnecting snowsheds of *Idarado Mining Company's* Treasury Tunnel near Ouray, Colorado. The main mill was preserved by dynamiting. John Wise, company manager, said all tools, equipment, and mine equipment stored on the surface were lost. Around-the-clock cleanup operations at the lead-zinc-copper property began immediately. No precise estimate of damages is as yet available, but it is thought that replacement cost will be between $500,000 and $1,500,000.

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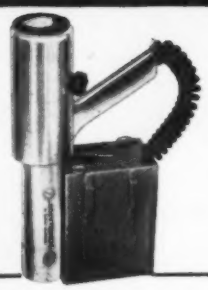

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Western Phosphates, Inc. has closed its temporary offices in Salt Lake City, Utah and has moved all personnel to its recently completed building at Garfield, Utah, site of a new $5,000,000 phosphate plant. Construction on the plant, which will cover 800 acres, is proceeding on schedule and construction should be completed by the end of 1953. A service road has been built to the plant site from the slag pile of *American Smelting and Refining Company*, electrical substations, employees' showers and lunch rooms are finished, and the foundation for a large product storage building has been laid. *Chicago Bridge and Iron Company* is setting up various types of storage tanks. When in operation the plant will have a capacity of 75,000 tons of product per year, most of which will be treble superphosphate. Ammonium phospate and phosphoric acid will also be produced. Western Phosphates is owned by *Kennecott Copper Corporation, American Smelting and Refining Company*, and *Stauffer Chemical Company*.

United States Geological Survey offices in Colorado, New Mexico, Arizona, and Utah have been reorganized into a Colorado Plateau District, to be headed by R. P. Fischer. Extensive geological mapping and diamond drilling in the Plateau for the AEC and the DMEA have resulted in some overlapping of functions, so parts of all four states have been incorporated into the new office. A. H. Koschman will continue to direct the Colorado-Wyoming district.

Tintic Standard Mining Company of Salt Lake City, Utah reports a net loss of $80,371.81 during the 1952 fiscal year, with mining operations being limited to shipments of dump ore, tailing, and a small tonnage of newly mined ore. The silver-lead producer lost $55,392.83 the previous year. From the Tintic Standard mine 46 tons of dump ore were shipped; 6,572 tons of tailing came from the Harold mill site; 505 tons of ore came from the *Iron Blossom* mine. The entire tonnage was shipped by lessees, with royalty income amounting to $4,827.68. One Tintic Standard subsidiary, *Eureka Lilly Consolidated Mining Company*, was closed down last fall. Before the shutdown, 2,475 tons of crude copper-silver-gold ore were shipped by lessees, with royalty income totaling $7,516.31 and net profit $1,557.80 for 1952. Eureka Lilly's 1951 net profit was $15,348.61 and its royalty payments $15,480.32. A second subsidiary, *Eureka Standard Consolidated Mining Company*, reports a net loss of $9,254.18, as compared with a net loss of 785.17 for 1951. Lessees shipped 3,240 tons of dump ore and made a royalty payment of $295.11. Mine maintenance, insurance, and taxes exceeded royalty income by $640.44.

Columbia University mineralogists have discovered a new mineral containing uranium called "umohite." The mineral, technically classified as hydrous uranium molybdate, is 48 percent uranium, the remainder being molybdenum and water. It was discovered by Dr. Paul F. Kerr, professor of mineralogy, and Gerald P. Brophy, graduate student, while making exhaustive tests on ores taken from a U. S. Atomic Energy Commission mine near Marysvale, Utah. Dr. Kerr said that the Marysvale district is the only known area containing the mineral, but that other western sites of extinct volcanic activity are likely prospects. Dr. Kerr believes that uranium is tied in closely with volcanic activity, especially in southern Utah where deposits of the metal occur along with molybdenum and selenium in widespread zones of clay "halos" formed by acid solutions of volcanic origin. Basic studies are being conducted on the theory by Dr. Kerr, and the raw materials division of the AEC is examining "umohite" further.

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New Jersey Zinc Sinks Ivanhoe Shaft 1050 Feet

The New Jersey Zinc Company has completed the first stage in development of its new mine in Ivanhoe, Virginia. The shaft has been sunk to a depth of 1,050 feet. Excavation of underground stations and driving of various levels are the next step in the program.

A permanent steel headframe will be erected this fall and its completion is timed to coincide with the installation of hoisting engines, cable drums, and other necessary equipment in a new hoist house which will be the first permanent building to be completed on the surface.

Ivanhoe is expected to produce a sizable quantity of zinc ore for the recently expanded milling operation at the Austinville mine, about two and one half miles away. The ore will be carried underground to Austinville through a 13,300-foot tunnel, 1,000 feet of which has already been driven.

According to the present schedule, the Ivanhoe should be in production sometime in 1955.

Taconite Concentrates Produced at Oliver Plant

The initial shipment of an expected 500,000 tons a year of taconite concentrate from Oliver Iron Mining Division of U. S. Steel Corporation's Pilotac plant at Mountain Iron, Minnesota occurred two years and 23 days after ground was broken at the plant by R. T. Elstad, president of Oliver.

Pilotac pit operations will produce 2,000,000 tons of crude ore per year and the concentrate from this will be shipped to the Extaca plant in Virginia, Minnesota. After crushing and grinding, crude ore is beneficiated magnetically to recover the contained magnetic iron minerals, which are subsequently dewatered and nodulized or sintered at the Extaca plant.

The Pilotac pit, three-quarters of a mile long, was stripped of 2,000,000 cubic yards of overburden under a contract let to S. J. Groves and Sons Company. A wide variety of drilling and blasting techniques are being used to test the efficiency of each for future mining.

Green Mica Now Approved For Government Purchase

The U.S. government will now accept green mica at the U. S. Mica Purchasing Depot at Spruce Pine, North Carolina. Specifications will be the same as those for ruby mica and may be obtained at the depot. Prices on the green mica are expected to average about 20 percent less than for the ruby mica which the government has been purchasing.

In addition to meeting regular ruby mica specifications, the green mica will be subject to testing by an electrical device—the Q meter. Reports indicate that only check samples from different mines will be tested.

It is believed that miners in the depot district have large quantities of green mica on hand and it is expected that this supply will be delivered to Spruce Pine depot immediately.

At the end of May, only 10 percent of the Tri-State district's 21 concentrating mills were in operation. *Eagle-Picher Company's* Central mill, largest in the area with a capacity of 15,000 tons of concentrate per day, eliminated its third shift. Previously, Eagle-Picher had closed down four of its mines which had employed 91 workers.

"Genesis of Clays and Related Minerals" will be the theme of the Clay Minerals Conference to be held at the University of Missouri at Columbia, Missouri, October 15 through 17. The conference is sponsored by the National Clay Minerals Conference, a branch of the National Research Council. Anyone interested in presenting a paper on this theme or on clay mineralogy, technology, physical behavior of clays, techniques of mineral determination, origin of soils, clays related to ore deposits, and allied topics, should contact A.F. Frederickson at Washington University, St. Louis, Missouri.

American Zinc Company reportedly will open a new $1,000,000 zinc mine near New Market, Tennessee. The mine shaft alone is expected to cost about $400,000 and will extend about 900 feet into the ground. Mine output will be about 1,500 tons of ore daily, and production is expected within about 18 months.

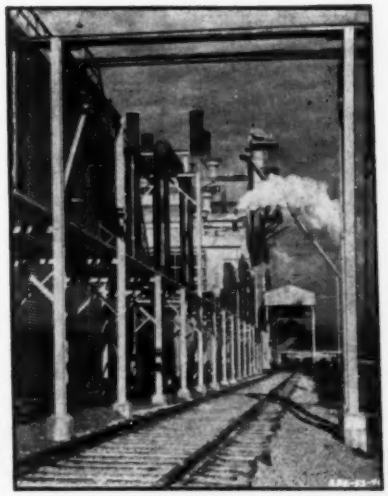
Oglebay, Norton & Company of Cleveland, Ohio has been appointed exclusive sales agent for the *Rosiclare Lead & Fluorspar Mining Company*, Rosiclare, Illinois.

The *International Salt Company* has purchased all rights to mine salt beneath the Wayne County, Michigan airport. The company is expected to begin exploratory drilling shortly. Mining will be at least 1,000 feet below the airport surface, and will not interfere with airport operations. Exhaust air shafts from the mine will be located on the 40-acre site.

A panel of the Minerals and Metals Advisory Board of the National Academy of Sciences has recommended development of plans for the substitution of a nickel-aluminum-copper alloy claimed as a suitable replacement for beryllium-copper alloys now used in spring applications. The recommendation applies to a hypothetical critical situation where curtailment of beryllium for industrial use might occur. The alloy rec-

AEC'S OHIO PRODUCTION CENTER

The United States Atomic Energy Commission's Feed Materials Production Center at Fernald, Ohio, a section of which is shown above, is nearing completion and some portions of the plant are already in operation. The FMPC is a completely integrated series of plants whose function is to convert raw uranium ore into nearly pure uranium metal in various shapes. The process is designed to reclaim essentially all of the uranium contained in the ores, and also a substantial portion of the chemicals used in various process steps. Among the intermediate products produced in the process are "orange oxide" (UO_3), "green salt" (UF_4), and metal ingots, rods, and "slugs". The manufacture of uranium "feed" compounds and metal, as at Fernald, is an integral part of the process chain leading to the production of fissionable materials in the atomic reactors at Savannah River, and Hanford, Washington, or in the gaseous diffusion separation plants at Oak Ridge, Tennessee. The George A. Fuller Company of New York City has the construction contract for the $78,000,000 project, and the National Lead Company of Ohio has been named the operating contractor.



ommended has the following composition: Cu. 84.3 percent, Ni 9.5 percent, Al 4.5 percent, and Si 1.7 percent. Its substitution would require the allocation of about five pounds of nickel (now very scarce) for every pound of beryllium replaced (about 250 tons of nickel per year at the current rate). At the moment world beryllium reserves seem to indicate ample supply. In the U.S. the Beryllium Corporation estimates a reserve of about 500 tons at Newry, Maine. As of May 22, 1953, the General Services Administration had purchased 21,298 pounds of beryl at its Franklin, New Hampshire depot and 7,896 pounds at its Custer, South Dakota depot. Another depot is located at Spruce Pine, North Carolina. The three depots are authorized to accept up to 25 tons of beryl ore annually from individual producers. The program terminates automatically on June 30, 1955, or when a total of 1,500 short dry tons of ore have been received.

For the fourth time in five years, the *Richard* ore mine of *Colorado Fuel and Iron Corporation* at Wharton, New Jersey has won the Statewide Interplant Safety Contest. All active mines in the state competed in the contest sponsored by the New Jersey Department of Labor and Industry. The achievement is particularly noteworthy because of New Jersey's low industrial accident rate.

At Niles, Ohio, *Mallory-Sharon Titanium Corporation* has opened the first industrial laboratory to be devoted exclusively to research and development on titanium. Basic research, development of titanium and titanium alloys, and production testing will be carried out in the new facilities, which include a chemical laboratory, metallographic and spectrographic equipment, mills for hot rolling test specimens, furnaces for heat treating and melting, and an x-ray diffraction unit, in addition to normal laboratory test equipment.

The *U.S. Bureau of Mines* has released a report describing a series of government tests with torque wrenches which have shown that the wrenches are satisfactory for checking initial load placed on slotted bolts used in supporting the roof or underground mines. The experiments were conducted at the *Dehue* mine of the *Youngstown Mines Corporation* at Dehue, West Virginia, where the Bureau has been studying all phases of roof-bolting, an increasingly popular method for supporting mine roofs.

ALCOA Mining Company, a subsidiary of *Aluminum Company of America*, has been liquidated to simplify the corporate structure of the parent company. The subsidiary's operations have been transferred to the newly created Mining Division of ALCOA. There will be no change in functions and responsibilities of the mining company's personnel. ALCOA Mining Company's operations are located at Bauxite, Arkansas; Eufaula, Alabama; Rosiclare, Illinois; and adjacent areas in Kentucky; Love Hollow, Arkansas; and [illegible]nas. Other mineral holdings are in [illegible]regon, Colorado, and Alaska.

The *American Standard[illegible] Association* announces the undertaking of a new project aimed at interchangeability of diamond tools and their holders. The *Industrial Diamond Association of America* will represent the interests of suppliers.

Jones & Laughlin Steel Corporation's New York Ore Division at Star Lake, New York is currently installing a new martite section which will produce 90 tons of concentrate per day. The present plant also produces 900 tons per day, so output will be doubled. The first martite unit was built at a time when the reserve picture was one of martite to two of magnetite. Now that the ore ratio is one to one, an addition to the initial martite plant is under construction by *Treadwell Company*.

The *International Minerals & Chemical Corporation* is test drilling in Hillsborough and Polk counties, Florida, for the United States Atomic Energy Commission. The AEC has instituted the exploration program to determine why uranium, which is known to exist in the phosphate field, is present. Cores will be studied by the United States Geological Survey which is supervising the program. Drilling sites will cover the entire phosphate field, an area of about 30 to 40 miles in diameter in western Polk and eastern Hillsborough counties. The holes will average about 100 feet in depth.

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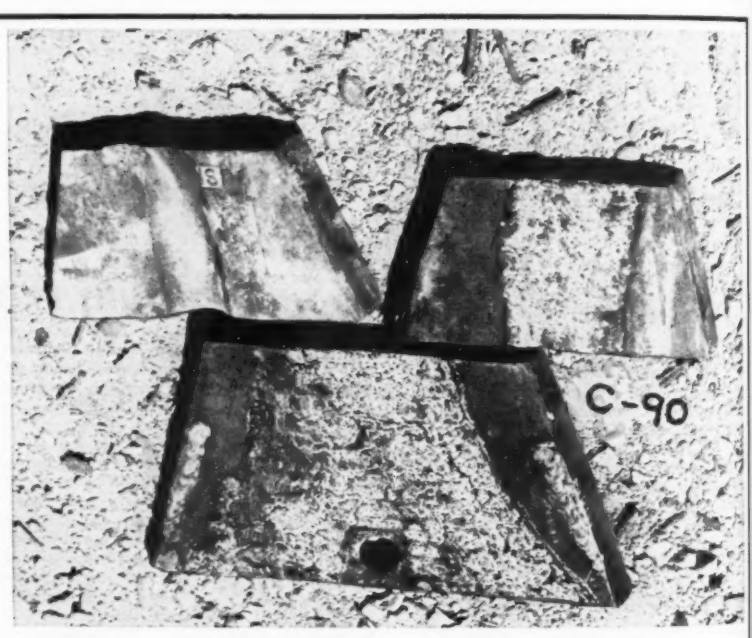

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sold to a Chicago mining and mineral company. The famous old mica mine, one of the first to operate in the Spruce Pine district, is a part of the Heap and Clapp mining properties which belong to the estate of Ella Clap Thompson. No plans for reopening the mine have been announced.

IRON RANGES

The *Attapulgus Minerals and Chemical Corporation*, formerly the *Minerals Separation North American Corporation*, will close the office and laboratory it has maintained in Hibbing, Minnesota for the past 10 years. The company came to Hibbing in 1942 with the object of developing processes for the flotation treatment of low-grade iron ore and taconite. A flotation process developed by Earl H. Brown and F. X. Tartaron in the Hibbing laboratory was used successfully for several years on current tailings produced in the Canisteo washing plant of the Cleveland-Cliffs Iron Company at Coleraine. Further research work on iron ore will be conducted in the Lakeland, Florida laboratory of the corporation.

The Mineral Beneficiation Division of the A.I.M.E. will hold its annual fall meeting in Hibbing, Minnesota on August 31, September 1 and 2. Effort will be directed primarily towards the inclusion of important field trips to operating plants on the Mesabi Range. For the first time, two of the major taconite concentrating plants will be open to engineers attending the meeting. These are the Reserve plant at Babbitt and the Oliver plant at Mt. Iron. Included also are visits to Dutch States Mines heavy media cyclone plants and regular heavy media and washing plants for the beneficiation of iron ores. Trips will be made through the mines to permit inspection of large-scale mining operations. Attendance is expected to be heavy and it is requested that those planning to attend make arrangements for registration and housing at the earliest possible date due to the limited facilities that will be available. Registration information may be obtained by writing to E. C. Herkenhoff, Pickands Mather & Co., Hibbing, Minnesota.

The Great Lakes ore carrying fleet hauled the greatest tonnage of ore in June of any June in its history when the vessels transported 13,744,894 tons. The figure was also the third highest ever carried in any one month in history, being exceeded only by the 14,388,625 tons in September 1952 and 14,367,627 in August of the same year. The best previous June was in 1951 when the fleet hauled 13,166,130 tons. The season's total on July 1, 1953 was 36,058,371 tons, compared to 21,516,194 on July 1, 1952.

The U.S. Bureau of Mines recently released a paper by Vernon C. Davis, mining engineer, formerly connected with the Bureau, describing more economical and efficient methods of blasting taconite. The work covered in the report was done between August 1946 and June 1950. Research was conducted on taconite deposits near Mesabe, Minnesota, and involved three different steps: 1. primary blasting of taconite using shaped charges in holes drilled in the rock; 2. secondary blasting of taconite using shaped charges on top of rock fragments already broken by the initial blasting; 3. primary blasting of taconite using conventional charges in horizontal, inclined and vertical holes drilled in the rock. This report adds considerably to the technical knowledge available in the expanding taconite industry and should prove of extreme value to operating personnel.

After nearly 40 years of operation, the *Bennett* mine (underground) ceased production in April. *Pickands Mather & Company* have transferred some of the underground miners and other personnel to the recently developed underground operation at the *Albany* mine near Hibbing. Open pit mining will continue, with ore being mined by power shovel and truck from the three open pits at the Bennett. R. T. Bell is present mine superintendent. Operations at P-M's new *Loomis* open-pit mine were temporarily suspended during the spring break-up. Large masses of slow moving mud prevented maneuvering of trucks. Since the stripping operations began during last winter, a pit approximately 800 feet long, 400 feet wide, and more than 45 feet deep had been excavated.

Western Mining Company is making plans for the installation of a 160-long-tons-per-hour cyclone plant in connection with the West Hill HMS plant, which is now under construction by Western-Knapp Engineering Company near Grand Rapids, Minnesota. Pickands Mather & Company is the operating agent for this property. The new plant is scheduled for operation beginning with the 1954 shipping season.

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Amador to Purchase Lease On Green Mountain Mine

Amador Mining Company with headquarters in Superior, Montana, will purchase the long-term lease of the Kootenay Copper Mines, Inc. on the Green Mountain mine near Dixon, Montana. Purchase price of the lease, including machinery and equipment, will be $100,000 payable by means of royalty and a share of the gross profits of the operation.

The mine is now unwatered to the No. 3 level and preparations are being made to sink the incline shaft to open the new No. 4 level 110 feet below. As the first stage of operations, 500 feet of drifting along the contact vein will be done at this level. If results are satisfactory, the shaft will be deepened another 200 feet. The mill, which is being readied to treat the ores, combines treatment of the copper ores by flotation with gravity concentration for producing a heavy specific gravity concentrate of gold, silver, platinum, and palladium.

The Green Mountain mine has a recorded production of over $250,000 worth of copper-gold ores. In the past, shipments to Anaconda Copper Mining Company's smelter at Anaconda, Montana have averaged about 45 percent copper, 3.0 ounces of silver, 0.5 ounces of gold, and 0.5 ounces of platinum. Production was made along the strike of the hanging-wall contact of a gabbro dike for a length of 960 feet from shallow workings, the deepest being less than 200 feet from the surface.

James F. Charlton is president of Amador and Merrill H. Christman, to be superintendent in charge of mine operations, is vice-president.

Prospectors Course to be Given at U. of Washington

The University of Washington School of Mineral Engineering will offer a course in mineral identification, prospecting methods, mining law, elementary geology, and related subjects important to prospectors, beginning October 1. Registration, which must be done during the preceding week, is open to anyone interested in mining and does not require admission to the university. Fee for the course is $10.

A special feature this year is that mining subjects will be taught on Saturday so that many people employed during the week will be able to take advantage of some sections of the course.

Donald L. Anderson, who taught the series from 1947 to 1949, who has been mine superintendent for the La India Mine in Nicaragua, and who has had mining experience in Canada and the Coeur d'Alene district, will instruct. Further information may be obtained from the Director of the School of Mineral Engineering, University of Washington, Seattle 5, Washington.

Sullivan Mining Company of Wallace, Idaho has been granted a two-year extension of the July 1, 1953 deadline for beginning underground exploration at the property of *Silver Mountain Lead Mines, Inc.*, east of Mullan. The Sullivan firm said it did not wish to undertake the proposed $800,000 program at this time because of low base metal prices.

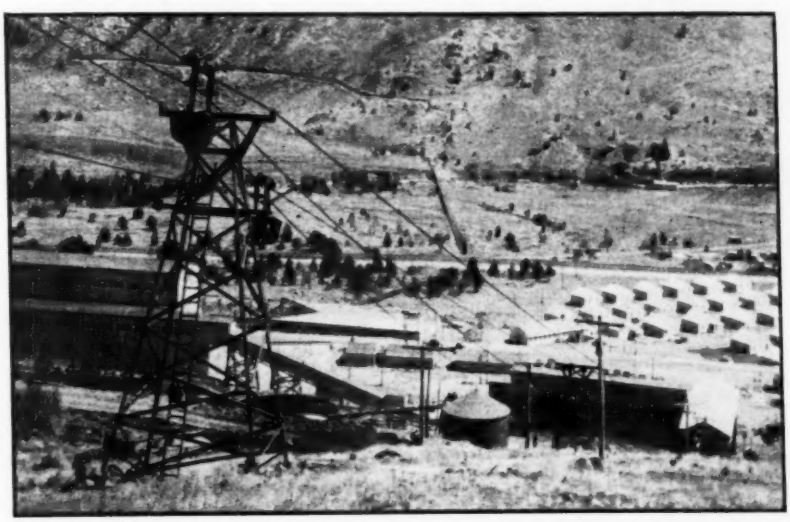
The *San Francisco Chemical Company's* phosphate mine near Montpelier, Idaho, has been approved by the State Mine Inspector for installation of underground Diesel machinery. The mine had operated for several years as an open-pit operation and had closed in 1947. It is now being reopened for underground mining.

Development work has started at the *Hole in the Wall* gold, copper, and silver claims of George Hyde in the Williams Creek area of Idaho. The Hole in the Wall vein is reported to have been discovered some years ago but abandoned because of the rugged cliffs between the Salmon River and the mine which made the property inaccessible. A thick wall of conglomerate has been driven through to expose the vein. To date, the 54 inch vein has been drifted on for 10 feet.

At last report, *Sunshine Mining Company* was operating its recently reactivated electrolytic antimony plant at capacity but stockpiling production. R. D. Leisk is general manager of the company's operations in Shoshone County, Idaho.

At the *Vulcan-Galena* mine west of Wallace, Idaho, *American Smelting and Refining Company* is crosscutting southerly from a new 2,800-foot level to open a tetrahedrite-bearing siderite vein discovered on the 3,000 level and explored for more than 700 feet. J. E. Berg is general manager of the firm's Northwestern mining department, with headquarters in Wallace.

An 8,500-foot adit being driven to the main *Star* mine shaft from the Hecla surface plant at Burke, Idaho has reached the halfway mark. Progress has been at the rate of about 21 feet daily on a three-shift basis. The 10x11-foot bore will eliminate pumping 100,000,000 gallons of water yearly from Hecla mine workings and provide other economies. Ralph W. Neyman, general man-



NEW TRAM LINE WILL HAUL CHROME

A view of the new 1½-mile-long tram line scheduled to go into operation at the property of American Chrome Company at Nye, Montana next month. Riblet Tramway Company of Spokane, Washington is building the facilities which will have a capacity of 100 tons per hour. Chrome ore from the Mouat mine is hauled down the mountainside to the lower terminal where it is dumped automatically into bins. The difference in elevation between the upper and lower terminals is 1,700 feet. Two of the 16 structural steel towers which support the 26,420 feet of 1½-inch and 1¼-inch wire rope (supplied by Bethlehem Pacific) can be seen above. A tension station will be located in the middle of the line to permit better control of the tension in the track cables. Fifty buckets on the line, each with a capacity of 1,800 pounds, will haul the ore. The mine is being put back into production with a $2,825,000 assist from the Defense Materials Procurement Agency.

ager of *Hecla Mining Company*, is in charge.

Coeur d'Alene Mines Corporation of Wallace, Idaho has suspended its exploration activities in the Silver Belt south of Osburn under an operating agreement with *Polaris Mining Company*. Some of the mine's haulage equipment will be used by Polaris in its 10,000-foot East Exploration Project from the Silver Summit mine's 3,000-foot level. The Coeur d'Alene shaft and workings were being surveyed by Polaris in connection with a proposed raise to Coeur d'Alene's 2800 level from the long and deeper bore.

Bunker Hill & Sullivan Mining and Concentrating Company has started deepening its *Crescent* mine shaft east of Kellogg, Idaho on an around-the-clock basis. A clamshell mucker is in use. Cost of the DMEA-approved project is estimated at $1,098,750. Work will include deepening the shaft from the 1,200-foot level to the 3,200-foot horizon, which is below sea level.

Deepening the main shaft 320 feet at *Day Mines' Hercules* mine in the Burke district of the Coeur d'Alene mining region, Idaho is nearing completion. The project is part of a $242,860 exploration project approved by DMEA.

Silver Bowl, Inc. has resumed work at its *Stewart* property at Kellogg, Idaho with the object of intersecting the property's main vein missed in work done several years ago.

Whitedelf Mining and Development Company has opened 45 feet of silver-lead ore along the faulted section of the Pearl vein at its juncture with the Pugh Fault in the *Whitedelf* mine near Clark Fork, Idaho. The discovery was made on the new 800-foot level. No ore was found in this section of the vein on the 400 level above. It was the second ore body found in the faulted part of the vein on the new level this year. Compton I. White, Jr. is president and manager.

The *Stevenson* cobalt property in Lemhi County's Black Bird district is being developed by *Quebec Metallurgical Industries, Ltd.*, a subsidiary of *Ventures, Ltd.*, another Canadian firm. The property adjoins *Calera Mining Company's* cobalt operation. The Quebec firm expects to produce concentrates for treatment in the new smelting plant of *Cobalt Chemicals, Ltd.* near Cobalt, Ontario. Long-range plans call for eventual shipments to the multi-million dollar power and metallurgical plant development which Ventures, Ltd. and its Q.M.I. and Frobisher subsidiaries are planning in northern British Columbia.

Silver Star-Queens Mines, Inc., is mining development ore from the footwall vein in its *Queen of the Hills* mine at Bellevue, Idaho. In the *Minnie Moore* mine, a 250-foot raise is nearing completion. A milling program is being studied. N. T. Davis is president and manager.

Centrida Mines, Inc. has been organized to develop the *Pope-Shenon* copper mine on Sal Mountain, nine miles southwest of Salmon, Idaho. A one-third interest has been acquired by *Coeur d'Alene Silver Giant, Inc.* of Kellogg.

The DMEA has signed a contract with *J. R. Simplot Co.* of Boise, Idaho for an $18,190 search for columbium, tantalum and uranium on the Dismal Swamp property in Elmore County, Idaho.

Work of reopening the old *Weber* mine near Lakeview in the Idaho panhandle has been resumed by *New Rainbow Mining Company*. Work was halted in February by the death of George H. Austin of Spokane, company president. His son, Robert B. Austin of Wallace, is directing operations.

Nabob Silver-Lead Company of Kellog, Idaho is diamond drilling on the 900 level of its Pine Creek district mine to determine upward persistence of a new vein discovered last year on the 1,300 level and opened for 585 feet of ore. An ore pass is being run from the 900 to the 750 level. Production has been suspended because of low base metal prices. H. J. Hull of Wallace is president.

Gibbonsville Mining and Exploration Company is trucking lead-zinc-silver concentrates from its new flotation plant in the Coeur d'Alene River valley west of Kellogg, Idaho, to the *Bunker Hill* smelter in Kellogg. The plant is treating old mill tailings washed down the river from the Wallace-Burke area. Wellman Clark of Spokane is vice president.

Inspiration Lead Company has started a 20-hole diamond drilling program at its property north of Osburn, Shoshone County, Idaho. W. T. Anderson of Spokane is secretary-treasurer and manager.

Directors of *Caledonia Silver-Lead Mining Company*, Kellogg, Idaho, have approved an agreement under which *Bunker Chance Mining Company* would prospect Caledonia mineral rights along with its own under the townsite of Wardner. The project includes 1,000 feet of sinking.

Preliminary tests indicate that black sands along Leggett Creek in Idaho

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County's Ten-Mile mining district contain rare-earth minerals, zirconium, and other strategic minerals more valuable than the gold content. If final tests are satisfactory, Leggett Creek placer operation will resume this summer after a year's inactivity. In 1950 and 1951 it operated a dragline and dry-land gold washing plant on its three miles of placer ground. E. G. Wagner, Lewiston mining engineer, is one of the partners.

An additional 500 feet of drifting along a zinc-tungsten vein has been approved by the DMEA at the *Meadowview* mine in Custer County, Idaho. The government agency has granted an $18,000 extension of the original $9,120 exploration project. A six-foot width of good ore showed in the face upon completion of the initial project last fall. Two veins were intersected in 110 feet of crosscutting. Work included 95 feet of drifting. Elmer Enderlin of Wallace, owns the property.

A 200-horsepower, 60-kw Diesel motor-generator has been installed at the *Twin Peaks* mine of *Idaho Consolidated Mines, Inc.* on Rattlesnake Creek in Lemhi County, Idaho. The mine now is completely equipped. A 50-ton flotation plant is connected with the mine portal by a 600-foot tramway. Values are in lead, silver, copper, cobalt, and gold. The 12-claim property has been under development for several years by the firm which was incorporated in 1947. Edmund G. Wilson of Seattle, is president, and Charles Kapp, mine manager.

Fluoride Mines, Inc. of Wallace, Idaho, has been incorporated by F. E. Scott, Jack D. Gay and E. J. Koski, all of Wallace. Capitalization is $500,000.

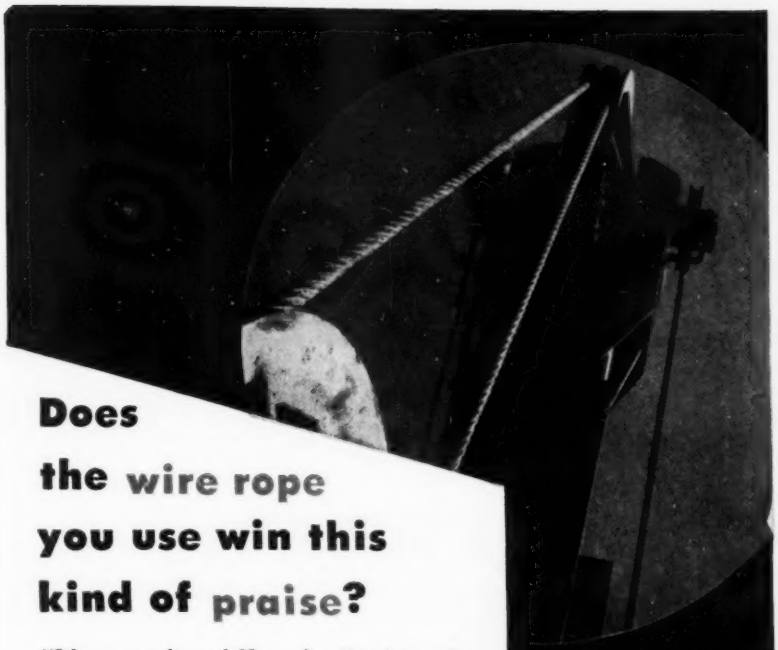
Lost Poet Mining Company of Pocatello, Idaho has been incorporated for $50,000 by Howard Carlyle of Twin Falls; Herbert Carlyle of Pocatello, and Rex J. Richardson of Pocatello.

MONTANA

Minerals Engineering Company of Grand Junction, Colorado, was the lowest of four bidders on a contract for 5,000 to 10,000 feet of diamond drilling in the Boulder-Batholith region of Jefferson County, Montana. Lloyd J. Conklin, acting manager of the Salt Lake City exploration office of the *United States Atomic Energy Commission*, says that the AEC is seeking confirmation of the existance of autunite ore bodies there.

Reserves of vermiculite at *Zonolite Company's* Libby, Montana, mine have been enlarged to "almost unlimited tonnages" through development of new processes enabling the company to treat low-grade ore surrounding the high-grade, the firm disclosed in its annual report. New ore processing plants at Libby and in South Carolina are planned at a cost of about $500,000. Construction is scheduled to start soon. The Libby claims are being patented.

The *Storm Lake* tungsten property in Deer Lodge County, Montana has been leased by *Sunshine Mining Company* from *Mines Prospecting and Exploration Company* of Missoula, headed by Earl F. Gilstone. The Sunshine firm operates the nation's largest silver mine in north Ida-



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ho's Coeur d'Alene dsitrict. The Storm Lake property, consisting of the *Tarlach* and *Tungstar* groups of eight claims, originally was worked as a silver prospect. A 150-foot shaft and shallow underground workings exist on the property.

Philipsburg Tungsten Mining Company, a newly organized firm, plans to build a mill to treat the copper-silver-tungsten ores of the *Combination* mine in the Black Pine district, Granite County, Montana. Incorporators were A. L. Applegate, John W. Cole, W. L. Degenhart, Ben Walkup, B. G. Paige, E. T. Irvine, and J. C. Ettien, all of Philipsburg.

Montoro Mining Company of Virginia City, Montana was incorporated recently by Cecil L. Thompson, Adrian C. Thrupp, and Richard E. Tifft, all of Seattle, with capital of $100,000.

Snake Mining Company of Lloyd, Blaine County, Montana has been incorporated for $100,000 by Arnold B. Dirkes of Great Falls, and Frank Glasser and Lloyd, and Dave Parenteau all of Neihart.

The *Eva May* property in Jefferson County, Montana will be explored for lead-zinc-copper by *Neuberg Brothers* and *Sloan, Inc.* under a $45,400 DMEA contract.

Barite is being produced at a rate of 12 to 14 cars of pulverized material and 4 to 6 cars of crushed material weekly near Greenough, Missoula County, Montana by *Finlen & Sheridan Mining Company*. The company is owned by James T. Finlen and L. M. Sheridan, both of Butte, and James P. Murphy of Missoula.

Pony Tungsten Enterprise has been organized to explore a tungsten discovery made near Pony, Madison County, Montana by three Montana School of Mines students. Incorporators were Fred D. Box, E. J. Clary Sr. and Jr. of Pony, Andrew L. Mular of Butte, and John Rytlewski of New York City.

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OREGON

One of Oregon's old gold-copper mines—the *Almeda*, north of Galice, Josephine County—is being diamond drilled by *Alaska Copper Corporation*, headed by C. F. Herbert of Seattle. The company is controlled by *Yukon Placer Mining Company* and *Transcontinental Resources Ltd.*, of Toronto, Canada. Roy Hillis of Galice owns the Almeda which yielded a reported $100,000 worth of ore between 1908 and 1916. Ore bodies occur in a wide zone of intense silicification following the contact between porphyritic dacite and argillite.

The Defense Minerals Exploration Administration has approved a $560 mercury exploration project at the *Strickland Butte* mine in Crook County, Oregon. The government will loan Morris and Charles Page of Prineville $4200 of the estimated cost.

The *Kaiser Gypsum Company* has given up its lease on the perlite quarry and plant near Maupin, Oregon, and has dismissed 65 employees. Title complications on the property prevented the company from exercising its option to purchase. Kaiser Gypsum had leased the operation in May 1952 from *Dant & Russell, Inc.* of Portland.

The *Rice Brothers* mill near Takilma in Josephine County, Oregon has recently been sold to Eggers and Tyce.

WASHINGTON

Newest operation in Washington's Metaline district is on Bromide Mountain where Adam Miller and Thera Young are exploring the *La Sota-Clara* silver prospect under a leasing agreement. Some machinery has already been taken into the property.

Border Lord Mining Corporation has contracted for completion of a 23-mile access road started last year to the old *German* tungsten mine west of Loomis in Okanogan County, Washington. Plans include renovating an old mill on the property and installation of machinery.

with a view to getting into production. Stanley Sorenson of Seattle, is president.

Washington Non-Metallics, Inc., a new enterprise, has leased *Northwest Marble Products Company* facilities at Chewelah, Washington from Ernest Smith. It also has leased eight quarries and additional land with a view toward manufacturing marble products in addition to marble chips. R. H. Dills of Chewelah, is president; Gordon LaVigne of Chewelah, vice president; and Richard F. Thorsen of Spokane, secretary-treasurer.

Sunny Peak Mining Company has resumed development work on its *Mohawk* and *Gubser* groups of claims near Conconully, Okanogan County, Washington. Two tunnels are being reopened. One will be extended to cut a vein expected to have nearly 500 feet of workable block. Charles J. Weller of Spokane is president.

At the Old *Eagle Mountain* copper camp near Chewelah, Stevens County, Washington, *Chewelah Copper Company* is preparing to put the long-idle *Copper King* and *United Copper* mines back into production. A large, two-compartment log ore bin has been completed at the portal of the lower Copper King tunnel and an old bin near the portal of the adjacent 400 level adit of the United Copper has been reconditioned. Eventual production of 250 tons daily is planned. The ore would be trucked about 25 miles to the Bonanza-Lead mill north of Colville. The company also has acquired on a royalty basis the nearby *Copper Queen* property of 11 claims and 80 acres of deeded land. Gordon LaVigne of Chewelah, is company president, and W. B. Moorhead, mine foreman.

The *Galena Farm* prospect in Stevens County, Washington's Northport mining district is the scene of new exploration work. Bulldozing is being done along one of three lead-silver veins uncovered last fall. Plans include extending an old tunnel into the mountain to gain more depth, and crosscuting to open the veins. The property adjoins on the south *American Smelting and Refining Company's Van Stone* open-pit mining operation. E. J. Mullen of Chewelah is principal owner.

Pacific Northwest Alloys, Inc., a subsidiary of *Chromium Mining and Smelting Corporation* of Montreal, Canada, has obtained a 10-year lease on the government-owned magnesium plant at Mead, Washington, near Spokane, and is converting it to production of ferro-chrome. The company plans to spend nearly $1,500,000 on conversion. Kilns will be altered to handle low-grade chrome ore and vacuum equipment added to the 432 reduction furnaces. Monthly production of more than 7,000,000 pounds of ferro-chrome is planned, with a payroll of 350 to 400. The government recently canceled a contract under which the firm had been producing magnesium for the nation's stockpile for nearly two years. Ferro-silicon needed in the magnesium process, also was produced. Chrome ore reportedly would be obtained from Montana, the Philippines, Turkey, and South Africa under present plans. The company will pay the government a minimum rental of $158,000 annually, plus 1 percent on its gross sales up to $18,000,000 and 2 percent on gross sales above that amount. H. B. Megill of Spokane is executive vice president and general manager of Pacific Northwest Alloys.

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Control of Banner Mining Purchased by Tintic Firm

Control of Banner Mining Company of Tucson, Arizona has been purchased by Tintic Standard Mining Company of Salt Lake City, Utah, U-Tex Oil Company of Salt Lake City, John M. Wallace of Salt Lake City, L. L. Travis of Dallas, Texas, and Earl Hollandsworth of Longview, Texas.

The Tintic firm reports that it has paid $100,000 and has committed itself to pay an additional $165,000 for one sixth of the total outstanding common stock. U-Tex Oil, Wallace, Travis, and Hollandsworth are committed to pay $4.60 a share for 60 percent control of the stock.

Banner recently signed a contract with the U. S. Defense Minerals Procurement Agency for production and sale of 12,960,000 pounds of copper at 31 cents a pound, f.o.b. middle-western markets, from mines in Pima County, southwest of Tucson. The government is advancing $473,665 for development of the property which includes the Mineral Hill group and the Plumed Knight group. A 400-ton concentrator reportedly is planned, along with office buildings. The mill should be completed within a year.

A second DMPA contract covers the Copper Glance and Copper Queen claims located at Twin Buttes, about seven miles south of Mineral Hill. Total value of the contract is $135,789.

The firm also plans early development of fairly high grade and presumably extensive copper deposits indicated by diamond drilling and geophysical examinations of properties in the same area.

A. B. Bowman will remain in his position as president of Banner Mining Company. No changes in management will be made.

Arizona Property Explored By New Jersey Zinc Co.

Verde Exploration, Ltd. has negotiated a contract with New Jersey Zinc Company for further exploration of Verde's properties near Jerome, Arizona.

Under the terms of the contract, subject to approval of stockholders, New Jersey Zinc agrees to spend a preliminary $50,000 in 1953 for exploratory drilling. The firm also agrees to finance cash requirements of at least $10,000 for certain options, leases, and land purchase agreements, and to underwrite Verde's operating expenses up to $16,000 a year. New Jersey Zinc may withdraw at any time after expenditure of the first $50,000 or it may continue further exploration at its own expense for a period of three years to June 30, 1956.

In return Verde will give New Jersey Zinc an option on all properties to be exercisable by a company to be formed by New Jersey Zinc, owned 51 percent by it and 49 percent by Verde. If and when a commercial ore body is disclosed, New Jersey Zinc will finance development to $1,000,000 including sums previously expended under the contract. In any additional financing, Verde must participate or suffer dilution of its 49 percent stock interest.

Pioche Manganese Opens New Henderson Smelter

The Pioche Manganese Company, an affiliate of Combined Metals Reduction Company, has opened its new smelter at Henderson, Nevada where it will treat manganese nodules from the company's mill at Castleton, Nevada.

Combined Metals has been operating in the Pioche district for many years. It was the complex sulphide lead-zinc ores it was mining that caused the company to select the name of Combined Metals. After operating a plant in Utah, a flotation mill was constructed near Castleton in 1940 with a 600-ton per day capacity. A solution to the problem of dividing the manganese-lead-zinc ores into their separate components lead the firm to increase the plant to two units in 1944 and to three units and a sink float plant in 1952. The third flotation unit was especially built to handle manganese-lead-zinc ores. This increased the plant capacity to 2,500 tons per day.

Pioche Manganese was formed in 1951 to handle the manganese nodules from the Castleton mill. The new Henderson smelter, under construction since 1951, will now convert the manganese nodules into ferromanganese.

The plant has two Pacific Lectromelt electric furnaces, each rated at 7,500 kva producing 1,500 tons of ferromanganese or its equivalent per month from each furnace. This will require the full production—based on 300 tons of feed per day—of nodules from the kiln plant at Castleton. Richard W. Lottridge is manager of the Henderson operation.

MINERAL SHOWINGS IN NEVADA NEAR LAKE MEAD

This infra-red panorama of a portion of the Gold Butte Mining District in Clark County, Nevada, taken by Howard W. Fitch of San Francisco, shows the contact between a granitic formation in the foreground and the sedimentaries, mostly Devonian, on the far side of the valley. The actual contact is hidden by a layer of alluvium covering the valley floor. Skarn minerals, including scheelite, have been identified near this contact and, according to Fitch, tin, titanium and gold occurrences have been uncovered. At least two copper mines, the Copper City and the Tramp Copper, have been worked in the sedimentary ridges in the background. A portion of the northern branch of Lake Mead can be seen in the left background.

ARIZONA

Six claims recently staked in the area west of Petrified Forest National Monument in Navajo County, Arizona have yielded some uranium ore. P. M. Coston and High Barton, both of Holbrook, are holders of the claims. Two other uranium claims being developed in the same area are held by W. Dean Nutting and J. R. McEvoy; while a third is held by Jack Hunt, Mel W. Young, and Stan Owens.

About three carloads of copper ore per month are being shipped from the *Tejon* mine, in the Turquoise mining district of Cochise County, Arizona, by the *Tejon Mine Leasing and Development Company*. The ore is said to run from 4 to 6 percent copper, with some gold and silver values, and to average 84 percent in silica. The mine operations are directed by William Ward of Tombstone, Arizona.

The *Holland* mine, operated by E. W. McFarland of Nogales, Arizona, is reported to be preparing to resume stoping and shipping ore. A production of about 100 tons per week is expected with a working force of six men. During recent months, work at the Holland had been limited to exploration and development because of the low prices of lead and zinc. A year ago ore shipments were running from 350 to 600 tons monthly.

An 18-mile-long access road is being constructed between Globe and Pleasant Valley, Arizona, to provide access to potential asbestos properties, as well as mines already producing in that area. The project will be partially financed through certification by the Mining Requirements Division of the Defense Materials Procurement Agency whose program consists of two phases: to improve sections of existing roads and to build new ones.

The government's manganese purchasing depot at Wenden, Arizona is now operating on a two-shift schedule to increase daily sampling capacity from 400 to 700 tons. A dust control system is being installed because dust from ore handling is a nuisance problem at the depot. Present purchasing trends at the four manganese depots (Philipsburg, Wenden, Butte, and Deming) indicate that the allotted 6,000,000 units to be purchased per depot will probably not be met at Philipsburg and Butte. In this event, a request will be made that these quotas be reduced and Wenden's purchasing quota increased.

Shipments of copper ore at the rate of 120 tons weekly are being made from the *Bonanza* mine in the Duquesne district of Santa Cruz County, Arizona, and present plans call for an increase to 50 tons daily in the very near future. The mine is being worked under lease from *Nash Mines* by Carl S. Elayer, doing business as *Elayer and Company* of Silver City, New Mexico. Exploration work under a DMEA contract has been in progress for several months and a body of copper ore, said to run as high as 10 percent copper, has been opened. The discovery is one of the few certified by DMEA as being of sufficient importance to warrant possible commercial production. The DMEA contract will be completed in about a month. Paul L. Hunter of Patagonia, Arizona is mine superintendent.

C. Neil Vogel of Tombstone, Arizona is diamond drilling at the *Gallagher* mine of the *Gallagher Vanadium and Rare Metals Corporation*. The location of the drill hole is about 300 feet south of the old mill on the property and about one-half mile south of the Stella shaft which has been allowed to fill with water. The hole, down about 60 feet at mid-June, is expected to intersect the ore vein at a depth of 130 feet. It is being drilled at an angle of 50 degrees.

A prospect shaft is being sunk at the *Copper Blossom* group of seven unpatented claims, 8 miles southwest of Tombstone, Arizona, by Jules B. Gallagher of Tombstone. The shaft is down 35 feet and a hoist is being installed. The operators plan to sink to a depth of 116 feet, then drift on the 100-foot level.

Systematic exploration at the properties of *Tombstone Development Company*, Tombstone, Arizona is being undertaken by *Newmont Exploration, Ltd.* under a working agreement, terms of which have not been made public. A surface crew of 12 men is already at work at the West Side shaft, where preparations are underway for installation of an electric hoist and pumping equipment. It is understood that Newmont plans to dewater the 600-foot level, which means dropping the present water level about 18 inches, and then diamond drill from that level. If results are encouraging, it is believed that Newmont Exploration will unwater and explore other of Tombstone Development Company's holdings in the area. Don Hargrove is superintendent in charge of the present program. Barney Greenlee, superintendent of the recently closed Newmont Mining Corporation's subsidiary, Resurrection Mining Company, at Leadville, Colorado, reportedly will be transferred to Newmont's project at Tombstone after final closing of the Resurrection operations.

Mobilhome Corporation of Phoenix, Arizona was the successful bidder for construction of 100 prebuilt houses for *Bagdad Cooper Corporation* at Bagdad, Arizona. By terms of the contract, all houses will be for sale. The 75 two-bedroom houses must be priced at $6,500 or less and the 25 three-bedroom houses at $7,500 or less. The houses will be built in the Phoenix plant, then delivered to the new townsite by truck. Bagdad Copper Company has prepared the townsite, and streets, utility connections and foundations will be ready ahead of house delivery. Mobilhome will place the house on its foundation and it will be ready to move into almost immediately. The delivery rate set calls for four houses a week. The construction company recently completed a contract for similar prebuilt houses for *Kennecott Copper Corporation* at Ray, Arizona.

B.S.&K. Mining Company reports that it is deepening the shaft at its *Atlas* mine near Red Rock, Arizona, and extending the drift on the 70-foot level. Plans are to establish two more levels at 50-foot intervals. Meanwhile, the

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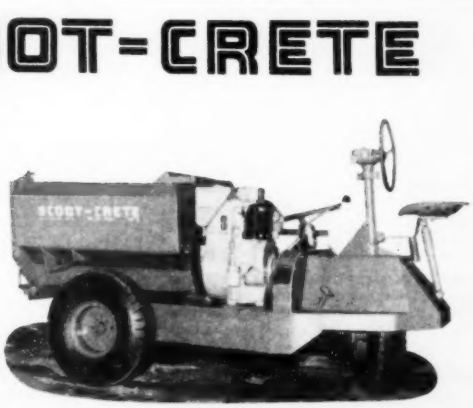

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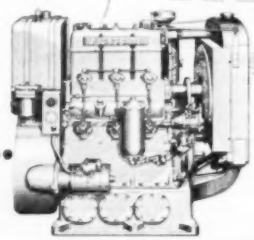

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company is also diamond drilling and has located ore pockets of lead and zinc. B.S.&K. holdings adjoin those of the *Silver Bell* mine, owned by *American Smelting and Refining Company*, but the ores are entirely different from those of Silver Bell. A. M. Kalaf is president; W. W. Simon is vice president.

The *Black Pearl Mining Company* of Bagdad, Arizona is continuing the production of tungsten ore and is treating the ore in a small jig plant at the property. A larger and more complete mill will be erected when a suitable method of recovery has been worked out. Principals in the Black Pearl company are E. A. Scholz and J. H. Cazier. K. K. Paumala is mine superintendent.

The *Klondyke Mining Company* of Klondyke, Arizona, is sinking a new shaft at the *Ten Strike* mine. The shaft, which is being sunk in the ore vein, is to be carried to a depth of about 120 feet, the level of a 125-foot tunnel. Principals in the company are J. F. Rydbom and Dale Callihan of Klondyke, and J. C. Anglin of Tucson. Two men are employed.

A DMEA contract for $26,975 has been negotiated for exploration of the *Mystery* asbestos mine on the San Carlos Indian Reservation near Globe, Arizona. Work at the Mystery will be conducted by Jack L. Neal and D. E. Green, lessees of the property. Three miles of road will be built, then a tunnel driven to explore the deposit.

The *Indian Springs Asbestos* mine, 14 miles east of Globe, Arizona, will be explored by means of a $14,000 DMEA contract. Contractors are William Scott, Harry Scott, and William Vinck, all of Globe.

Miami Copper Company expects that its net earnings for the first half of this year will exceed that earned in the same period of last year, now that the company is mining a normal grade of ore. Mining during the last half of 1952 and the early part of 1953 was of lower grade ore which adversely affected operations for those periods. Output for all of 1953 is not expected to total any more than in 1952 (about 50,000 tons) but production in 1954 will be about half of this figure. This will result from cessation of *Castle Dome* mine operation and transfer of equipment from that property to the new *Copper Cities* orebody. Production should again be back to normal by 1955 when Copper Cities will begin producing. Under a government contract, the company has an option to sell to the United States 170,000,000 pounds of copper out of the first 192,500,000 pounds produced at Copper Cities at a floor price of 23.00 cents per pound.

The *Ontop* mine, a gold prospect in Plumas County, California, which had been on an "idle and maintenance only" status since World War II, is being reopened by H. E. Fowler, owner and operator. An air compressor and air lines to most of the underground workings have been installed. Ninety percent of the workings have been rehabilitated, enlarged, or improved. A new access road, maximum grade of 10 percent, is nearing completion and excavations and foundations for new surface structures are partially completed. A limited amount of underground exploratory development work is planned for this summer and more extensive work during the winter.

The *Hazel* mine near Hornbrook in Siskiyou County, California is now being operated by Pete Eastman and Cassidy & Caldwell, who also lease the *Independence* mine.

Kaiser Steel Corporation has officially dedicated its third blast furnace at Fontana, California, increasing the west coast's pig iron capacity by 50 percent. The new furnace is the major unit of

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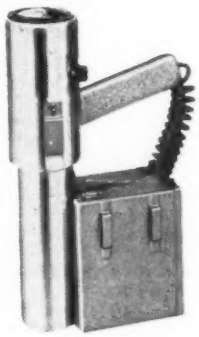

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Kaiser Steel's $65,000,000 expansion program started 14 months ago. It has a rated capacity of 438,000 tons of pig iron per year. To furnish the 50 percent increase in iron ore and coal required by the new furnace and coke ovens, major expansion programs at the company's iron ore mine at Eagle Mountain, and the coking coal mines at Sunnyside, Utah have been necessary.

The United States Geological Survey has released a report on the "Geology of the Tungstar and Hanging Valley Tungsten Mines" in Inyo County, California. Copies are on file at the Geological Survey in San Francisco and the California Division of Mines and Geology in San Francisco.

The Day Tunnel on the *New Almaden* property of the *Cordero Mining Company* has been reconditioned for 3,000 feet from the portal. The company is continuing an exploration program from this tunnel to locate cinnabar deposits. Diamond drilling on the surface last year failed to disclose any sizable commercial quantities. The property is near San Jose.

The *Pawnee* mine in the Beauty Mountain district of San Diego County, California is reported to be shipping scheelite concentrate. A 40-ton mill, crusher, and four tables have been installed. J. C. Clout is in charge.

A new 15,000-tons-per-year aluminum fluoride plant is now in operation at the Bay Point Works of *General Chemical Division, Allied Chemical & Dye Corporation*, Nichols, California. The plant will produce exclusively for *Kaiser Aluminum and Chemical Corporation* for use in the manufacture of aluminum. Kaiser's mine at Fallon, Nevada, will supply the fluorspar used in making aluminum fluoride.

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Getchell Mine, Inc. of Red House, Nevada, is currently milling 900 tons per day of tungsten ore, including 300 tons per day of custom ores. Milling operations are under the direction of Keith Kunze. An extensive research program is being conducted on Getchell sulphide gold ore. The sulphide ore body occurs along the Getchell Fault, while the tungsten-bearing tactite ore bodies are found along the contact of the intruded grano-diorite stock and limestones. The two ore deposits, tungsten and gold, are distinctly different and are separated by several miles or more.

A fire of undetermined origin destroyed the flotation section of *Manganese Inc.'s* mill at Henderson, Nevada shortly after the company had completed three weeks' operation producing about 300 to 350 tons of sinter per day. The mill had not yet had a full month's run at full capacity. Management estimates that the mill will be down for about six months.

Black Rock Mining Corporation is producing 300 tons of tungsten ore daily at its *Lincoln* mine near Hiko, Nevada. The mine is an underground operation; ore is then concentrated by tabling, followed by flotation at the mine site. Diamond drilling is also being carried on in an attempt to extend the known mineralization. Joseph Strutzel is manager; James Perkins is general superintendent; Orville Moyes is mine superintendent; E. George Green is mill superintendent.

Diamond drilling is being conducted at the *Gold Pick* mine, adjacent to the *Summit King* mine north of Tonopah, Nevada. L. G. Palmer and A. P. Decker of Bishop, California are performing the drilling. Peter Fabbi, owner of the property, has leased it to Robert S. Griffith and associates of Las Vegas.

Newmont Exploration Ltd., a subsidiary of the *Newmont Mining Corporation*, has a major lead development project underway near Hamilton, White Pine County, Nevada. Pete Loncar who formerly was mine superintendent of Newmont's mining operations at Goldfield, Esmeralda County, Nevada, is mine superintendent. Newmont Exploration's western operations are under the supervision of Don Hargrove, exploration manager, with headquarters at Montrose, Colorado.

A new firm, *Sunrise Mining Corporation*, has been formed in Tonopah, Nevada to mine a lead-silver property owned by Peter Fabbi. Ore shipments have been made from the mine in the past, and there is a 70-foot shaft in useable condition, as well as a tunnel leading to underground workings. E. M. Trevaskis of New York City is president and manager; A. A. Green III of Seattle is comptroller; Fred Steen secretary and treasurer; and Mr. Fabbi a director. The property is located at Lone Mountain in Esmeralda County, Nevada.

Titanium Metals Corporation is currently producing about four tons per day of titanium from its plant at Henderson, Nevada, and hopes to increase this to ten tons daily shortly. *Allegheny Ludlum Steel Corporation* and *National Lead Company* are joint owners of Titanium Metals.

Haile Mines, Inc. has started construction of a 300-ton per day heavy media and jig plant at the *Lake Valley* manganese property near Deming, New Mexico. Approximately 300,000 tons of average 18 percent ore is contained in the mine, and it is believed that it can be upgraded to a 30 to 40 percent grade by means of a simple sink-float and jig treatment. The plant is expected to be in operation in October.

International Minerals & Chemical Corporation reports that it broke through to the station at No. 4 shaft three days ahead of schedule, thereby opening up the tunnel from No. 3 shaft and making it possible to reach any part of the mine from the four shafts. The total length of the drift was 8,420 feet, and it was located so that as much of it as possible was through ore. All of the men working in the southwest extension are now using the new shaft. This necessitated moving the change house from the No. 3 shaft and making other arrangements for establishing the new shaft as the main entry to the area. Machine and electric shops will be cut out near No. 4 shaft and lifts now installed at the bottom of No. 3 will be moved to the new shaft so that all equipment and material can also be lowered down in the No. 4 shaft.

The *American Potash Institute* reports that a total of 898,913 tons of potash sales containing an equivalent of 522,151 tons of K20 were delivered during the first quarter of 1953 by the seven major producers in the United States. This is by far the largest tonnage ever shipped by U.S. producers during any quarter and represents an increase of 35 percent in salts and 37 percent in K20 over the corresponding period in 1952. New Mexico produces 90 percent of the U.S. potash output.

The *Tower Mining and Refining Company* reports excellent progress in tests being made for manganese at the company's plant at Truth or Consequences, New Mexico. The plant is now processing about 50 tons of manganese ore per day, and additional machines are being installed to bring capacity up to 100 tons. Tests are said to have shown a 42 percent concentrate of manganese with 80 percent recovery.

U. S. Mining Men

(Continued from page 62)

urer, John **Eastlick**, stope geologist at Darwin; directors, **H. S. Bates** of the Mary **Darleen Mines** at Independence, California, and **L. A. Wright**, mining geologist for the California Division of Mines in Los Angeles.

Andrew **Gensey** and **Martin B. Westerman** have been appointed director and assistant director, respectively, of Kaiser Steel Corporation labor relations. Mr. Gensey succeeds the late Joseph B. **Petty. Mike Miller**, Henry J. Kaiser Company vice president, has been placed in charge of all joint venture work of the Kaiser Engineers Division.

Robert **J. Anderson**, aluminum industry metallurgist and former affiliate of the Southwest Research Institute, has opened his own office in San Antonio, Texas. Mr. Anderson will limit his consultation services to the aluminum and magnesium industries.

M. I. Signer, faculty dean at the Colorado School of Mines, will represent the school at an educator-management conference to be held by U. S. Steel Corporation.

Frederick Williams has been appointed assistant to **William Oesterling**, geologist at Aluminum Company of America's Rosiclare, Illinois operations.

R. G. Gustavson, chancellor of the University of Nebraska, and **Horace M. Albright**, president of the United States Potash Company, have been elected president and chairman of the board, respectively, of Resources for the Future, Inc. The group was organized last year to act as an advisory group on resources for the Ford Foundation.

William Boyd Woodward of Sunnyside, Utah and **Dwight Knupp** of Grays, Pennsylvania were among those receiving the Joseph A. Holmes Safety Association Medal of Honor, awarded by the Bureau of Mines for heroism in mine accidents. Mr. Woodward rescued fellow coal miner **J. L. Erskine**, who was trapped under a fall of roof, and Mr. Knupp saved the life of **Lawrence Geisbert** when both were knocked unconscious by a gas explosion.

Frank G. Woodruff, former general superintendent of iron mining for the Warren Foundry & Pipe Corporation, is now assistant to the president of Consolidated Stone and Quarry Company in Montclair, New Jersey.

C. H. (Pat) Murphey has been elected chairman of the Sante Fe, New Mexico chapter of the New Mexico Mining Association. **Mrs. Martin Pollock** is secretary-treasurer; **Verne Byrne**, first vice chairman; **Lou Gardesky**, second vice chairman; and **Clyde Lockwood**, third vice chairman.

Obituaries

William D. Thornton, 83, president of Greene Cananea Copper Company and Inspiration Consolidated Copper Company died in New York on June 10. Mr. Thornton, a native of Deer Lodge, Montana, studied at Columbia University. He had served on the boards of the Santiago Mining Company, Anaconda Copper Mining Company, Chile Copper Company and Chile Exploration Company.

R. Leslie Beattie, 62, vice president and general manager of Canadian Operations of the International Nickel Company of Canada, Ltd., died in Toronto on June 10. He managed the company's mines, mill, smelters, refineries and auxiliary operations in Canada and had been with the firm since 1911. Mr. Beattie was president and director of these International Nickel subsidiaries: Anglo-Canadian Mining and Refining Company, Ltd.; Canadian Nickel Company, Ltd.; The Upper Spanish Improvement Company, Ltd.; Canadian Nickel Products Ltd.; International Sales, Ltd.; Ontario Refining Company, Ltd.; Horseshoe Lake Mining Company, Ltd.; and George Gordon and Company, Ltd.

Frank Purnell, 66, chairman of the board of the Youngstown Sheet & Tube Company, died on April 19. He had been with the company since he was sixteen.

H. V. Rowe, general manager in Australia for Bewick Moreing and Company, died in Perth, Western Australia, early in June. He was a director of the Blue Spec Mining Company N.L.

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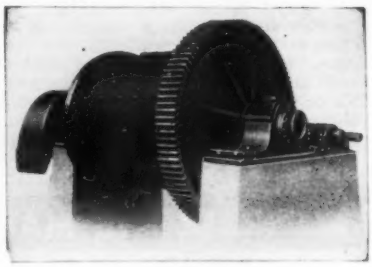

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NEW U-450—102 net horsepower at 1800 rated r.p.m.; 110 @ 2200 r.p.m.; maximum torque, 324 lbs. ft. @ 1200 r.p.m.

NEW U-406—91 net horsepower at 1800 rated r.p.m.; 98 @ 2200 r.p.m.; maximum torque, 279 lbs. ft. @ 1200 r.p.m.

NEW U-372—83 net horsepower at 1800 rated r.p.m.; 91.5 @ 2200 r.p.m.; maximum torque, 263 lbs. ft. @ 1200 r.p.m.

NEW U-269—62 net horsepower at 1800 rated r.p.m.; 72 @ 2400 r.p.m.; maximum torque, 191 lbs. ft. @ 1200 r.p.m.

NEW U-240—55 net horsepower at 1800 rated r.p.m.; 64 @ 2400 r.p.m.; maximum torque, 168 lbs. ft. @ 1200 r.p.m.

NEW U-220—50.5 net horsepower at 1800 rated r.p.m; 62 @ 2400 r.p.m.; maximum torque, 151 lbs. ft. @ 1200 r.p.m.

IH Announces Seven New International Engines

Seven new six-cylinder, carbureted, valve-in-head engines have been added to the International line, which now includes 18 models—diesel, gasoline or gas—ranging from 16.5 to 200 net horsepower.

These new models are the result of more than 45 years of IH engineering and manufacturing experience building a complete line of heavy duty engines for tractors, trucks, construction and oil field equipment and individual power unit applications.

These new units have the durability, flexibility and economy to meet your requirements for lower cost performance. The unmatched network of IH district offices, parts depots, distributors and dealers puts complete service facilities practically at your door.

If you are an individual user of engines, it will pay you to see your nearest International Industrial Distributor or Power Unit Dealer for more complete information. If you are a manufacturer, your nearest IH district office will be glad to help you engineer these engines into the equipment you are building.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS

INTERNATIONAL HARVESTER

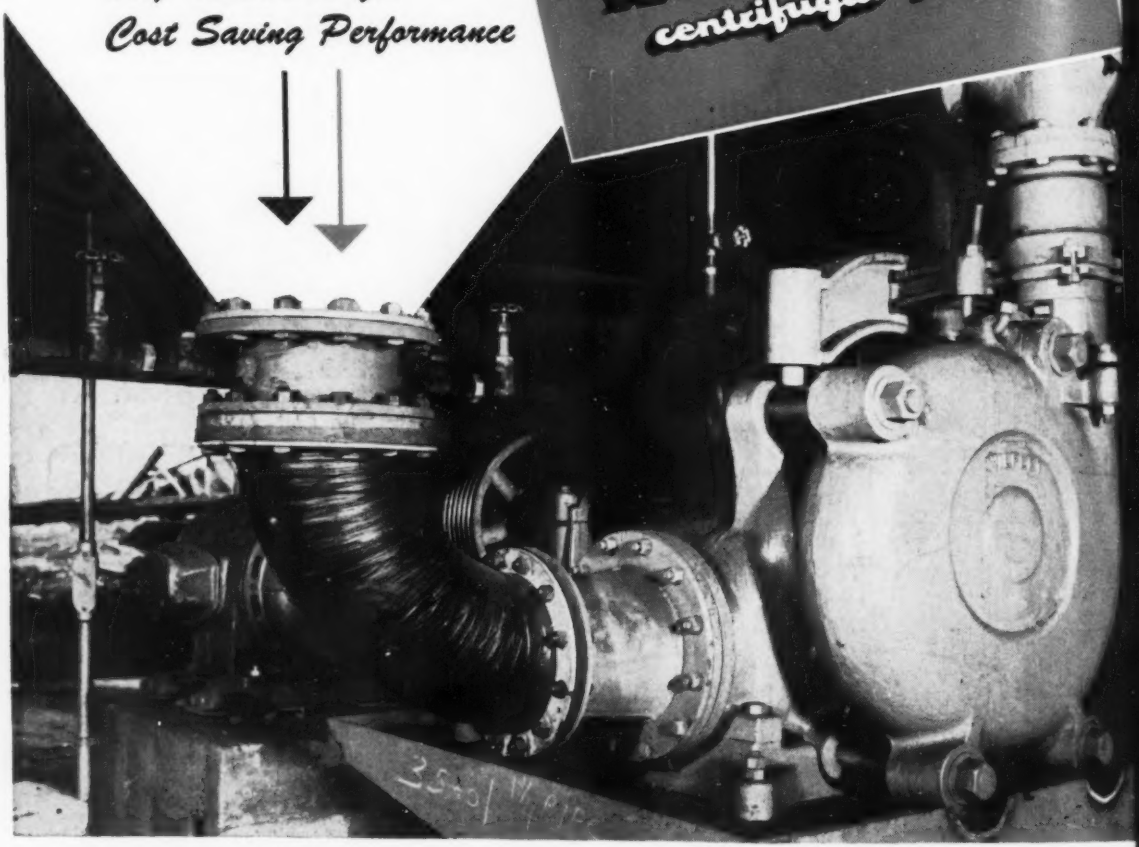
INTERNATIONAL

coal cleaning

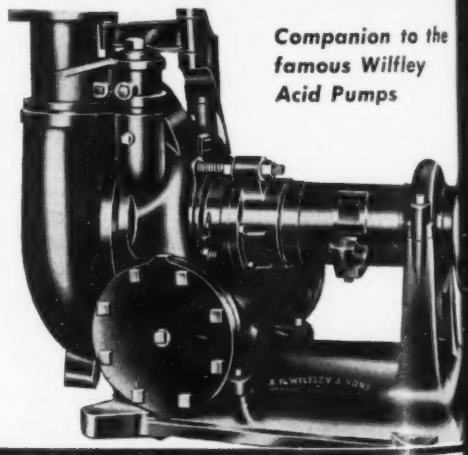
The picture below shows a Wilfley installation in a modern Coal Washing Plant in Pennsylvania.

Buy **WILFLEY** *for Cost Saving Performance*

WILFLEY
centrifugal PUMPS



In coal washing operations Wilfley Sand Pumps always turn in a notably efficient and economical performance. These rugged, dependable pumps deliver continuous, trouble-free performance on a 'round-the-clock schedule—make measurable savings in operating and maintenance costs. Individual engineering on every application. Write or wire for complete details.



Companion to the famous Wilfley Acid Pumps

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